Public Health Reports

VOLUME 58 JULY 2, 1943 NUMBER 27

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Public Health Reports

Vol. 58 • JULY 2, 1943 • *No. 27*

EFFECT OF LEAD ABSORPTION ON BLOOD CALCIUM[1]

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In view of the relationship that repeatedly has been shown to exist between calcium metabolism and lead, the question has occasionally arisen as to whether absorbed lead affects the blood calcium level. That the blood calcium content may be modified experimentally by various means is well known, and in view of the fact that lead is absorbed and transported in the blood stream in minute amount, is deposited in bone tissue and is susceptible to removal from the bones under certain conditions, any possible interrelationship of lead and calcium is of interest. The formation of a lead calcium phosphate and precipitation of blood calcium by lead which has been investigated by Bischoff and Maxwell (*1*) would seem of possible significance in this connection.

Changes in blood calcium have been shown to occur in a variety of cases. Castelli (*2*) found that the introduction of bacteria or their metabolic products into the circulation of a normal dog produced a lowering of total blood calcium. The lowering was not as marked as in parathyroidectomy but was constant and pronounced. Following the administration of parathyroid extract to six patients suffering from lead poisoning Hunter and Aub (*3*) found that blood calcium was usually increased.

Hughes, Titus, and Smith (*4*) found an increase in blood calcium ccompanying egg production. The calcium content of the plasma of chicks from 1 day to 4 months of age was very nearly constant, averaging about 13 mg. per 100 cc. In immature pullets, capons, mature cockerels, and moulting hens not in production it averaged 20 mg. With mature pullets in production it averaged 27 mg. and hens after moulting and in production it amounted to 31 mg.

Cheymol and Quinquaud (*5*) noted an increase in the calcium content of the arterial and venous blood following asphyxiation of a dog y mechanical obstruction of the trachea. Cheymol and Quinquaud o investigated the variation in blood calcium of dogs at intervals

[1] From the Division of Industrial Hygiene, National Institute of Health.

over 24 hours (*6*). With dogs confined to cages without exercise for 5 to 12 weeks the maximum variation in blood calcium was 1.1 mg./100 cc. When dogs were starved 25 to 50 days the blood calcium decreased 15 to 25 percent in the same period.

Fairhall (*7*) observed a slow initial increase in the blood calcium of dogs following exposure to ultraviolet radiation over a period of months with a return to normal after repeated exposure. Klein (*8*) stated that 20,000 to 100,000 times the daily dose of irradiated ergosterol necessary to cure rickets when fed to albino rats caused 50 percent greater increase in blood calcium than that of the controls. Conversely Taylor and Weld (*9*) found that with either the oral or subcutaneous administration of irradiated ergosterol there was a temporary fall in serum calcium followed by a rise. In a parathyroidectomized animal subcutaneous administration of one dose of ergosterol was followed by a further drop in calcium. Holmquist (*10*) noted that human blood calcium is highest at night during sleep when body temperature and blood adrenaline are lowest.

On the other hand serum calcium values were found by Mull and Bill (*11*) to be constant in women on a minimum diet, on a standard hospital diet, and on a freely selected diet. A variation of only 0.17 mg. per 100 cc. of serum was apparent under these conditions. Furthermore no evidence of seasonal variation of the serum calcium level was found. Similarly the investigation of Kirk, Lewis, and Thompson (*12*) showed that no significant variation of serum calcium occurs in men up to 85 years of age. Statistical analysis indicated the variation to be no greater with age classes than the variation within classes.

However, significant changes in serum calcium occur with certain types of disease. The elevated values found in hyperthyroidism and hyperproteinemia and the lowered values found in hypothyroidism, in certain cases of rickets, in osteomalacia, and chronic glomular nephritis are well known. The effects of minor affections upon serum calcium are less well established.

The effect of the administration of various toxic substances upon serum calcium has also been observed in several instances. In general a pronounced degree of toxicity is necessary to produce an effect of this sort. In the case of ethylene glycol observed by Dille (*13*) no effect was observed while McRae (*14*) found that the administration of mercury succinate intravenously to cats at the rate of 2 mg. per kg. of body weight at 15-minute intervals until death intervened produced a marked lowering of serum calcium. Similarly, sodium oxalate lowered the serum calcium values.

The effect of lead absorption upon serum calcium is more obscure than the effect of certain other toxic substances. According to Celcov (*15*) the absorption of lead markedly affects the blood calcium. With

slight amounts of lead absorption very little change in the serum calcium concentration is apparent, but in severe lead poisoning the serum calcium values are very appreciably increased.

In an investigation of the relative toxicity of lead compounds by Fairhall, Sayers, and Miller (*16*) the blood calcium value was found to fluctuate around the normal values for guinea pigs in all cases where the animals were exposed to lead or its compounds either by ingestion or by inhalation. No significant departure from the normal was apparent in any case. Other experiments (*17*) have indicated the possibility of a slight depressing action of lead absorption upon serum calcium. It was therefore felt necessary to subject the whole matter to a more searching investigation.

EXPERIMENTAL PROCEDURE

Four series of experiments were made, using white rats as experimental animals. In the first set of experiments the animals were given large doses of lead chloride (200 mg. per animal per day) over a period of 4 months in order to poison the animals severely. A similar group of control animals received the same diet but no lead chloride. At the end of the experimental period the animals were etherized and the blood obtained directly from the heart. The blood was transferred to a centrifuge tube, allowed to clot, and a measured amount of the clear serum analyzed for calcium by a slight modification of Kramer and Tisdall's method (*18*).

The values obtained in this experiment are shown in table 1. The average serum calcium value for the lead poisoned animals was 9.9 mg./100 cc. and is identical with that of the control group. Furthermore the individual variation is insufficient to indicate any significant

TABLE 1.—*Calcium content of the blood serum of rats following the daily ingestion of 200 mg. of lead chloride for 120 days*

Leaded animals		Controls		Leaded animals		Controls	
Number	Serum calcium mg. per 100 cc.	Number	Serum calcium mg. per 100 cc.	Number	Serum calcium mg. per 100 cc.	Number	Serum calcium mg. per 100 cc.
1	10.4	21	9.8	11	9.0	31	10.1
2	9.8	22	9.5	12	10.2	32	9.8
3	9.6	23	10.5	13	9.7	33	9.8
4	9.8	24	10.4	14	10.4	34	10.0
5	10.3	25	10.1	15	9.1	35	10.0
6	10.0	26	10.2	16	9.7	36	9.7
7	9.7	27	9.1	17	9.5	37	9.8
8	9.7	28	9.9	18	9.6		
9	9.5	29	10.3	19	10.8		
10	9.8	30	9.7	20	10.8		
				Average	9.9		9.9

trend within the two groups. Since analyses of the bones of representative animals in this group indicated that a notable amount of lead had been stored, it appears that marked absorption does not affect the blood lead.

EFFECT OF DIETARY VARIATION OF CALCIUM

Three groups of rats were placed on a diet which contained similar amounts of lead carbonate but varied with respect to its calcium content. The diet was so arranged that each animal ingested approximately 12 mg. of lead carbonate per day.

In the first group the calcium content of the food was 0.1 percent, in the second group 0.25 percent, and in the third group the calcium content was 0.56 percent. A set of control animals was also maintained at each calcium level. Each of these groups was kept on its respective diet for one year. At the end of that time the animals were sacrificed and their serum calcium content determined as indicated above. The data from these experiments are given in table 2.

TABLE 2.—*Serum calcium values of rats receiving approximately 12 mg. of lead carbonate per day for 1 year at various levels of calcium diet*

Low calcium group				Medium calcium group				High calcium group			
Leaded animals		Controls		Leaded animals		Controls		Leaded animals		Controls	
Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)
346	9.6	178	9.9	258	10.0	224	10.3	388	9.8	240	10.0
242	9.3	265	9.9	340	10.2	202	10.5	328	9.9	200	9.7
382	10.2	255	10.1	220	10.2	330	9.3	270	10.5	220	9.9
252	10.0	....	9.8	182	9.8	229	9.9	236	10.2	....	10.1
240	10.0	220	9.5	284	10.2	248	9.7	264	9.6	206	9.4
218	9.7	185	10.5	260	10.1	205	9.7	380	10.0	198	10.3
480	10.6	215	10.0	244	10.4	272	9.4	220	9.9	202	9.8
....	9.9	210	10.5	277	10.0	252	9.8	220	10.2	220	9.7
....	9.9	....	9.8	330	10.2	216	9.1	248	10.0	240	10.0
....	10.1	....	9.8	160	10.0	254	9.5	270	9.4	340	9.6
324	10.5	....	9.9	155	10.0	256	9.4	340	9.6	316	9.2
360	10.0	255	9.7	220	9.7	240	9.3	236	9.0	254	9.2
204	9.6	185	9.7	244	9.3	236	10.5	128	9.7	195	9.6
252	9.7	200	10.1	196	10.0	216	10.3	244	10.1	304	9.6
236	10.0	220	9.6	260	9.8	255	9.7	228	10.3	244	9.4
373	10.0	250	10.2	170	9.8	220	9.8	288	10.1	360	9.3
180	9.9	242	9.4	236	10.3	208	10.3	108	9.7	334	9.6
260	10.1	180	9.7	218	10.2	180	9.7	320	10.2	252	9.3
250	9.9	248	9.8	200	10.1	250	10.4	244	10.3	290	9.2
290	10.4	210	10.8	184	9.2	240	9.8	268	9.9	264	9.6
208	10.0	270	10.5	298	9.9	236	9.8	245	9.9	320	9.2
220	9.2	220	10.2	190	10.2	....	10.1	268	10.0		
218	9.8	218	10.2	250	9.6	....	9.8	211	10.0		
278	9.3	265	10.1	260	10.4	....	9.7	228	10.0		
216	10.0	235	10.3	224	9.8	....	9.6	216	9.0		
220	9.6	215	10.0	220	9.6			184	9.2		
204	9.5			276	10.1			220	10.0		
244	9.3			210	9.0			236	9.4		
236	9.6			268	9.8			271	9.6		
276	9.1			214	9.3			180	9.9		
188	9.7			236	9.3			300	9.2		
216	9.7			236	9.6			144	9.6		
260	9.6			260	9.1			216	9.6		
204	9.9			248	9.6			226	9.8		
248	9.8			176	9.0				9.7		
336	9.6			165	9.2				9.6		
238	9.4			296	10.5				9.7		
				200	9.1						
Average	9.8	....	10.0	....	9.8	....	9.8	....	9.8	....	9.6

The average value obtained for serum calcium in the low calcium group of leaded animals was 9.8 mg. Ca/100 cc. serum, compared

with 10.0 mg. Ca/100 cc. serum in the corresponding control group; in the medium calcium group the average serum calcium was 9.8 mg./100 cc. serum compared with 9.8 mg./100 cc. serum in its accompanying control group; and in the high calcium group the average serum calcium value for the leaded animals was 9.8 mg. Ca/100 cc. serum, as compared with the value 9.6 mg. Ca/100 cc. serum for the high calcium control animals.

There is therefore but little difference in the average figures in these several groups and furthermore there is insufficient variation within any given group to indicate that the absorption of lead on either a high or a low calcium diet appreciably affects the serum calcium level.

SUMMARY

Investigation of the serum calcium content of animals ingesting large amounts of lead as well as animals receiving smaller doses over a longer period of time at different levels of calcium intake indicates that lead absorption does not appreciably affect the blood calcium level.

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INFECTION IN MONKEYS WITH STRAINS OF *TRYPANOSOMA CRUZI* ISOLATED IN THE UNITED STATES [1]

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Indigenous American human trypanosomiasis (Chagas' disease) has not been recognized yet in the United States, although it has been known since 1933 (*1*) that *Trypanosoma cruzi*, the cause of the disease in Central and South America, commonly infects native species of *Triatoma*, or cone-nosed bugs. The question whether or not strains of *T. cruzi* present in this country are capable of causing the disease in man can be decided only if human infection is proved.

One of the common clinical signs of American trypanosomiasis as it is seen by clinicians (*2, 3*) in South America is a unilateral bipalpebral edema lasting several weeks. This is believed to represent a site of inoculation and to be caused by contamination of the ocular tissues with infective fecal material from insects. Romano (*4*) has reproduced this lesion in monkeys by dropping into the eye fresh fecal dejecta from a bug infected in the laboratory with a South American strain.

Although Wood (*5*) and Packchanian (*6*) have reported infecting monkeys with strains of *T. cruzi* isolated in the United States, no one has reported infecting this animal by dropping directly into the eye fecal material from infected native triatomids. Since the ocular route is probably a natural way of infection in man, it seemed important to determine whether United States strains of this trypanosome were capable of infecting monkeys by this avenue.

Strains of *T. cruzi* isolated from human cases in Panama [2] and Venezuela [3] were inoculated into monkeys to serve as a control for the native strains. However, the strains could not be compared fairly in this study because the human strains were not freshly isolated, and the number of experimental animals was too small.

Arrangements were made to have live specimens of *Triatoma* mailed to this laboratory. Of those sent, three specimens of *T. gerstaeckeri* [4] collected in Texas and one specimen of *T. protracta* [5] collected in California were found to harbor crithidia and metacylic

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[1] From the Division of Infectious Diseases, National Institute of Health.
[2] This strain was supplied by Dr. C. M. Johnson, Gorgas Memorial Laboratory, Panama.
[3] This strain was furnished by Dr. Felix Pifano, Instituto Nacional de Higiene, Caracas, Venezuela.
[4] These specimens were collected by Theodore McGregor, Entomologist of the Bureau of Laboratories, Texas State Health Department.
[5] This specimen was collected by S. T. Shaw, Plymouth, Calif.

forms of trypanosomes in the intestinal tract. In addition to these insects, laboratory-reared triatomids (*Triatoma gerstaeckeri* and *T. longipes*, natural carriers of *T. cruzi* in the United States) were infected by allowing them to feed on desert mice (*Peromyscus eremicus*) infected with strains of *T. cruzi* isolated from a specimen of *Triatoma gerstaeckeri* from Texas (Texas strain A) and from human cases in Venezuela and Panama.

TABLE 1.—*Data concerning monkeys infected with strains of* T. cruzi *isolated from* Triatoma *sp. in the United States*

Monkey No.	Source of strain inoculated	Days after inoculation trypanosomes present in blood	Highest temperature °C.	Days after inoculation eye lesion present	Histopathology	Remarks
2200	*T. protracta* No. 36 from California	19–58	40.4	17–24	No examination	Observed for 191 days.
2201	do	30–(46)	39.8	No lesion.	Leishmania forms in heart muscle.	Sacrificed on 46th day.
2217	Laboratory-reared specimen of *T. gerstaeckeri* infected with Texas strain A.	21–51	40.7	do	Leishmania forms in heart muscle, myocarditis.	Died on 90th day.
2218	do	14–36	40.5	14–25	No examination	Crithidia forms in fluid from edematous eyelid. Observed for 169 days.
2226	*T. gerstaeckeri* No. 115.9 from Texas.	15–38	41.0	No lesion.	do	Observed for 163 days.
2227	*T. gerstaeckeri* No. 116.6 from Texas.	15–38	41.4	do	do	Do.
2265	*T. gerstaeckeri* No. 44 from Texas.	14–49	40.0	13–17	Leishmania forms in heart muscle.	Died on 53rd day.

Data concerning monkeys infected with strains of T. cruzi *isolated from human cases*

2262	Laboratory-reared specimen of *T. longipes* infected with Panama strain.	19–49	40.3	17–(36)	Leishmania forms in eyelid on 20th day.	Biopsy of eyelid. Observed for 98 days.
2263	Laboratory-reared specimen of *T. longipes* infected with Venezuela strain.	19–56	39.9	No lesion.	No examination	Do.
2264	do	14–56	40.4	do	do	Do.

Ten young, tuberculin-negative monkeys (*Macacus mulatta*) weighing about 7 pounds were inoculated by dropping into one eye the expressed fecal material of an infected bug. The animals were not anesthetized and the ocular tissues were not scarified or injured in any way. Five monkeys were inoculated with fecal material from naturally infected triatomids collected in the United States and five with material from the bugs infected in the laboratory, two of which were infected with a Texas strain and the other three with the human strains.

Trypanosomes morphologically similar to *T. cruzi* were found in the blood of all the monkeys inoculated, and were present as early as the fourteenth day after inoculation in three animals and the fifteenth day in two. Examination of the blood every 3 to 4 days demonstrated their presence until the thirty-eighth to fifty-eighth day. The usual number of trypanosomes per 100 microscopic fields (4mm. x 10X) in fresh blood smears was about five during the height of the infection. The largest number found was 120 per 100 fields in the blood of monkey No. 2265 on the thirty-third day after inoculation. All of the monkeys had an elevation of temperature during most of the time trypanosomes were present in the blood.

Three (Nos. 2200, 2218, 2265) of seven monkeys inoculated with United States strains and one (No. 2262) of three inoculated with strains from known human sources developed bipalpebral edema in the same eye in which the infected material was placed. This edema first was noticed from the thirteenth to the seventeenth day after inoculation and in 2 or 3 days had reached the maximum swelling. The lids, especially the lower, were swollen and firm, and the skin was reddish purple in color. There was moderate inflammation of the palpebral conjunctivae. No chemosis, bulbar conjunctivitis, or dacryoadenitis was apparent. None of the animals had palpable preauricular or cervical lymph nodes. The swelling and discoloration gradually disappeared after lasting 4, 7, and 11 days in the three animals on which biopsies were not done.

At the time of maximum swelling of the lower lid of monkey No. 2262 a biopsy was performed. Histological examination [6] of the tissue sections showed fibroblast proliferation and focal infiltration, chiefly perivascular, by lymphocytes, plasma cells, and large mononuclear cells. The leishmania forms of the parasite were found near a focus of infiltration.

Saline was injected into the tissues of the swollen lower lid of monkey No. 2218, withdrawn, and examined microscopically. Two motile crithidia forms were found in the fluid.

These studies did not clarify the reason for the development of the eye lesion in some animals and its absence in others.

Complement fixation tests (7), using an antigen made with the Panama strain, were done on the serums taken from all 10 animals before they were inoculated and at weekly or bimonthly intervals for several months after infection. The serums taken before inoculation were negative, but 4 to 6 weeks later all the serums fixed complement in significant dilutions.

Seven of the animals remained alive, one was sacrificed, and two died during the time of observation. Beginning about 60 days after

[6] Histopathological examinations were done by Assistant Surgeon (R) Benjamin Highman, Division of Pathology, National Institute of Health.

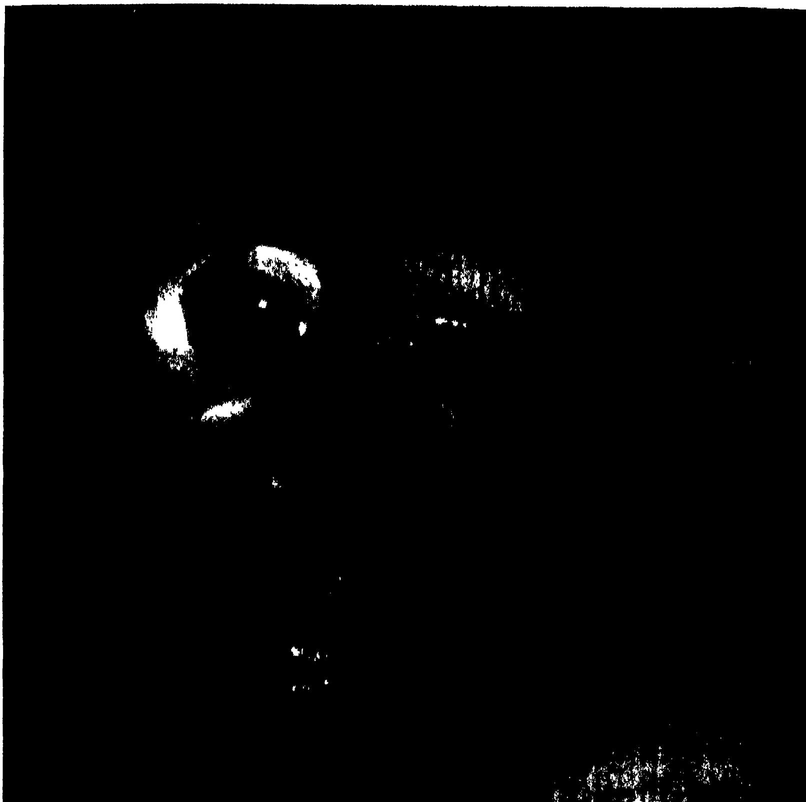

FIGURE 1.—Monkey No. 2218 with bipalpebral edema 16 days after fecal material from a triatomid infected with a strain of *T. cruzi* from Texas had been dropped in the left eye.

inoculation with a Texas strain of trypanosomes, monkey No. 2217 became increasingly emaciated, and was found dead on the ninetieth day. Trypanosomes had not been found in its blood after the fifty-first day. At autopsy the organs were, grossly, normal in appearance and size, and no evidence of tuberculosis or enteritis was found. Histopathological examination revealed a mild diffuse myocarditis with round cell infiltration and numerous leishmania forms in the heart muscle fibers.

Monkey No. 2265 was found dead 53 days after inoculation with a fresh Texas strain. One week before death, the animal was noticed to have diarrhea and to be emaciated. Many trypanosomes had been found in its blood since the fourteenth day, but examination 3 days before death revealed no trypanosomes, although a desert mouse inoculated with blood taken on that day became infected. From the thirteenth day until the seventeenth day the eye in which the infected dejecta was placed showed bipalpebral edema and discoloration. At autopsy the organs were, grossly, normal in appearance and size. Tissue sections of the heart showed a slight patchy round cell infiltration, and a few muscle fibers contained leishmania forms. No abnormalities were found in either monkey except those described; however, it is not certain that the trypanosome infection caused the death of the animals.

Monkey No. 2201 was sacrificed on the forty-sixth day after inoculation, and the autopsy revealed no gross abnormalities of the organs. In tissue sections of the heart a slight patchy diffuse and dense focal infiltration by lymphoid cells as well as groups of leishmania forms were present. There was slight patchy subepithelial infiltration by lymphoid cells in the eyelid that had been the site of inoculation.

SUMMARY

All of five monkeys became infected with *Trypanosoma cruzi* when fecal material from infected specimens of *Triatoma* collected in Texas and California was dropped directly onto the intact ocular tissues. Two monkeys were infected by the same route with fecal material from laboratory-reared triatomids infected with a Texas strain. Three monkeys were infected similiarly with strains of *T. cruzi* from human cases.

Three of the seven monkeys inoculated with United States strains and one of three inoculated with strains from known human sources developed bipalpebral edema at the site of inoculation

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SALMONELLA ENTERITIDIS: EXPERIMENTAL TRANSMISSION BY THE ROCKY MOUNTAIN WOOD TICK *DERMACENTOR ANDERSONI* STILES [1]

By R. R. Parker, *Director*, and Edward A. Steinhaus, *Associate Bacteriologist, Rocky Mountain Laboratory, United States Public Health Service*

During the year 1940 several of the guinea pig passage strains of rickettsiae maintained at the Rocky Mountain Laboratory became contaminated with *Salmonella enteritidis*.[2] In an attempt to purify a strain of Rocky Mountain spotted fever, normal adult *Dermacentor andersoni* were permitted to ingest blood from a passage animal. This was done with the hope that the ticks would subsequently transmit the spotted fever rickettsia but not the contaminating bacterium. However, in each of two experiments the test ticks acquired both disease agents and subsequently transmitted *S. enteritidis* to successive guinea pigs on which they were permitted to feed.

In the first experiment 10 adult ticks fed on a passage guinea pig for 2 days and then successively on 2 normal animals for the same period at intervals of 10 and 7 days, respectively. *S. enteritidis* was cultured from the blood of the second animal 4 days, and from that of the third 22 days after the removal of the ticks. This series of observations was interrupted because the ticks eventually refused to feed.

In the second experiment 15 normal male and female ticks were fed for 3 days on a strain guinea pig and after being held at room temperature for 35 days were allowed to feed on a normal guinea pig. At the end of the feeding period, *S. enteritidis* was isolated in pure culture from the heart blood of this animal. The ticks were successively fed on 5 more guinea pigs at intervals of 6, 0, 1, 9, and 7 days, respectively. *S. enteritidis* was recovered from the host guinea pig in all but one instance. This exception was the third

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

[2] The identity of this strain was confirmed by Dr. P. R. Edwards (University of Kentucky).

guinea pig of the series, the blood of which was not cultured until after the febrile period. Its temperature record suggested that this animal was also infected.

During the course of this experiment, 4 partially fed female ticks were examined for *S. enteritidis*. Each harbored the bacterium in large numbers. On four occasions the feces from the feeding ticks were inoculated into normal guinea pigs, all of which developed typical *S. enteritidis* infections.

The pertinent data for experiments 1 and 2 are given in table 1.

TABLE 1.—*Tests of adult* Dermacentor andersoni *for transmission of, and occurrence of,* Salmonella enteritidis. *Compilation of data with respect to the host guinea pigs*

Guinea pig	Date ticks attached	Date ticks removed	Number of ticks used	Number of live and dead[1] ticks removed	Date blood examined for *S. enteritidis*	*S. enteritidis* present in blood	Number of ticks tested individually for *S. enteritidis*	*S. enteritidis* present in ticks	*S. enteritidis* present in tick excreta
Experiment 1									
A69191[2]	Sept. 25, 1940	Sept. 27, 1940	10	10	----------	+	-------	-------	-------
A71891	Nov. 7, 1940	Nov. 9, 1940	10	3 (7)	Nov. 13, 1940	+	-------	-------	-------
A72442[3]	Nov. 16, 1940	Nov. 18, 1940	3	3	Dec. 10, 1940	+	-------	-------	-------
Experiment 2									
A69245[2]	Sept. 27, 1940	Sept. 30, 1940	15	15	----------	+	-------	-------	-------
A71892	Nov. 4, 1940	Nov. 9, 1940	15	7 (8)	Nov. 9, 1940	+	-------	-------	-------
A72443[3]	Nov. 15, 1940	Nov. 18, 1940	7	7	Nov. 22, 1940	+	-------	-------	+
A72533[3]	Nov. 18, 1940	Nov. 25, 1940	7	6 (1)	Jan. 7, 1941	? [4]	[5] 2	+	-------
A72745[3]	Nov. 26, 1940	Dec. 3, 1940	5	5	Dec. 3, 1940	+	-------	-------	+
A73711[3]	Dec. 12, 1940	Dec. 21, 1940	5	5	Dec. 20, 1940	+	-------	-------	+
A74454	Dec. 28, 1940	Jan. 6, 1941	5	2 (3)	Jan. 3, 1941	+	2	+	+

[1] Figures in parentheses indicate dead ticks.
[2] A69191 and A69245 were Rocky Mountain spotted fever strain pigs; these animals and those of several previous passages were infected concurrently with *Salmonella enteritidis*.
[3] Heart blood was bacteriologically sterile at time ticks were placed on guinea pigs.
[4] Blood probably cultured too late to recover *S. entertidis*.
[5] One of these ticks had died during feeding.

In another experiment the eggs and progeny of two groups of infected female ticks were tested. The tests for one group were all negative. The larvae and nymphs from the other group infected the guinea pigs on which they engorged and the bacterium was cultured from the larvae. Tests of egg samples and of the adult ticks were negative.

Of the guinea pigs to which the ticks were serially transferred in experiments 1 and 2, heart blood was cultured and found bacteriologically sterile from the second animal thus used in the first experiment and from the second, third, fourth, and fifth ones used in the second experiment (see table). As a further precautionary measure against the possibility of using guinea pigs that might already be infected, the test animals were selected, immediately following delivery, from animals from local dealers known to have healthy stock.

To guard against the acquisition of infection from another animal during the course of the experiments, the guinea pigs were not only strictly isolated in a building in which there were no other animals of any kind, but each guinea pig was kept in a separate can.

SUMMARY AND DISCUSSION

The data presented show that when *Salmonella enteritidis* is ingested by the Rocky Mountain wood tick *Dermacentor andersoni* the bacterium survives in the tick and can be transmitted by it, that possibly it may be passed on occasionally through the egg to the active stages of the next generation, and that the tick excrement is infectious.

The fact that this tick can transmit the infection as long as 35 days after an infective blood meal suggests that transmission may not be mechanical. However, it is also possible that it results from contamination of the skin or the bite wound with infectious tick excrement. The data further indicate that *S. enteritidis* is rather frequently fatal to ticks.

S. enteritidis is the second bacterium shown to be transmissible by *D. andersoni.* The first was *Pasteurella tularensis* (Parker, Spencer, and Francis (*1*)). Spontaneous infection with *P. tularensis* of *D. andersoni* and other ticks (*D. variabilis* and *Haemaphysalis leporis-palustris*) is now well established, and all three species are recognized carriers of the tularemia organism in nature and the two dermacentors to man.

It appears possible that *S. enteritidis* occasionally occurs spontaneously in *D. andersoni.* Several times in the past, ticks from nature under test for the presence of infectious agents have been suspected of being responsible for initiating outbreaks of *S. enteritidis* in guinea pigs, but it was never certain whether the bacterium was resident in the ticks or in the guinea pigs. In one such instance the suspected ticks were *Rhipicephalus sanguineus.*

Huang, Chang, and Lien (*2*) have reported the isolation of *S. enteritidis* from body lice taken from patients ill with proved *S. enteritidis* infections.

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REPORT ON THE FLEAS *OPISOCROSTIS BRUNERI* (BAKER) AND *THRASSIS BACCHI* (ROTHS.) AS VECTORS OF PLAGUE

By FRANK M. PRINCE, *Assistant Entomologist, United States Public Health Service*

It is well established that plague is transmitted under experimental conditions by the bites of fleas of a number of different species, and it is probable that those of other species are unable to convey the infection in this manner. Eskey and Haas (*1*) investigated 20 species among 31 collected from several western States to determine their capacity as vectors and accomplished successful results with 15, but were unsuccessful with 5 species. These observations become of much importance when the infection is found in an area, and the likelihood of its dissemination to adjacent or more remote areas must be considered.

During the fall of 1941, plague was found in each of four lots of fleas collected from Richardson's ground squirrels (*Citellus richardsonii richardsonii* (Sabine)) of Divide County, N. Dak. This constituted the first evidence of the disease in the Plains States, and it was essential to learn promptly whether there were suitable hosts and parasites which would foster its spread to sections of the country which lie further east. Richardson's ground squirrel is a susceptible host whose range extends eastward beyond Divide County, and specimens of it have been found infected with plague in each of several areas west of North Dakota. The lots of fleas collected from these animals in North Dakota included those of three species (*Opisocrostis t. tuberculatus* (Baker), *O. labis* (J. & R.), and *Oropsylla rupestris* (Jordan)) whose capacity as vectors had been previously determined (*1*), and also included those of one species, *Thrassis bacchi* (Roths.), which had not been investigated. *T. bacchi* was originally described as a parasite of *Citellus tridecemlineatus* (Mitchill), which was taken in Alberta, Canada, (*2*) and it has been subsequently found on the same species of squirrel in El Paso County, Colo. (*3*). It has been collected with specimens of the three species mentioned by field units of the United States Public Health Service from Richardson's squirrel of northeastern Montana, and from both Richardson's and 13-striped squirrels (*C. tridecemlineatus*) of North Dakota, as far east as Rolette County, the limit of the author's observations.

Opisocrostis bruneri (Baker), the second species included in this study, was described as a parasite of Franklin's ground squirrel (*Citellus franklinii* (Sabine)) and the 13-striped ground squirrel in Lincoln, Nebr., (*4*) and has been reported in collections from one or both of these squirrels of Colorado, Minnesota, Iowa, Illinois, and Wisconsin (*5*) and from *Citellus* sp. of Montana (*6*). Although specimens of *O. bruneri* were not included among the fleas taken at Divide County, N. Dak., large numbers of them, and of *T.*

bacchi, were collected from Richardson's, Franklin's, and 13-striped ground squirrels of Potter, Brown, and Spink Counties, S. Dak., by the Public Health Service. Attention was attracted to *O. bruneri* and its capacity as a vector because other species of this genus are efficient vectors and infest the same ground squirrel species, also because the geographical distribution of *O. bruneri* overlaps that of the species mentioned above and extends as far east as Illinois.

The author assisted with the investigations of Eskey and Haas (*1*) and has adopted their methods, with some desirable amendments, in the tests which are the subject of this report.

In Potter County, S. Dak., 42 *O. bruneri* and 40 *T. bacchi* were collected from Richardson's ground squirrels and their nests, and were forwarded by mail to the laboratory at San Francisco, Calif. where they were promptly fed on healthy guinea pigs. They were then held without food for a period of 48 hours, divided into two lots, and each lot was placed on a plague-infected guinea pig and allowed to remain with it until its death 2 hours later. No further opportunities were given to obtain the infection. A microscopic preparation was made of the heart blood of the infected animals just previous to their death, and 10 or more *Pasteurella pestis* were found in each of several microscopic fields examined. Experience has shown that this degree of bacteriemia affords a good opportunity for the feeding fleas to become infected. Each flea of both lots was then placed in a test tube and held at a mean temperature of 60° F., with minimum and maximum variations of from 44° to 76° F. After the single opportunity to feed on the infected guinea pig, each flea was fed on the clipped abdomen of a healthy guinea pig, at intervals of 2 to 3 days, throughout the remainder of its life, or until the experiment ended 75 days later. At the time of its death, each flea was examined for infection, by triturating it in normal saline solution and injecting the triturated suspension into a healthy guinea pig.

The shortest period through which feedings on normal animals were offered before transmission of the infection was accomplished was 3 weeks. In the meanwhile, 12 *O. bruneri* and 17 *T. bacchi* had died. The deaths occurred as early as the second day after the opportunity to obtain an infectious meal, and continued at intervals throughout the 75 days of the experiment. Three fleas survived until the end of the period and were then killed and examined. Consequently, the opportunities to effect transmission were not equal among all of the fleas, and no exact percentage of those which were capable of transmitting the infection can be estimated.

However, 8 *O. bruneri* and 10 *T. bacchi* became infected, and were infectious at the time of their death. It is quite probable that others became infected also, but subsequently cleared themselves through the repeated feedings on healthy guinea pigs, since Eskey and Haas

(1) concluded from their experience that as many as 19 percent of those of some species clear themselves by this means.

The first successful transmission was accomplished on the twenty-first day after the original feeding on the infected guinea pig, and the latest occurred on the thirty-fourth day. Four of the 8 infected *O. bruneri* and 4 of the 10 infected *T. bacchi* transmitted the infection to healthy animals. In other words, 50 percent of the *O. bruneri* and 40 percent of the *T. bacchi* which had become infected were successful as vectors. Two fleas died on the seventieth day and were infected, but neither had transmitted the disease, although they had had repeated opportunities to do so. The periods between the date

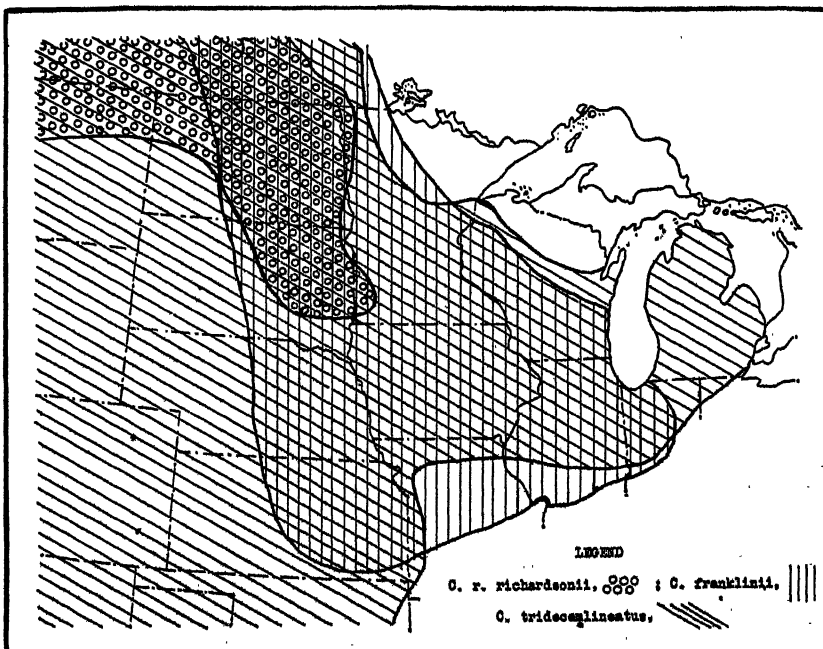

FIGURE 1.—Distribution of *Citellus richardsonii richardsonii, C. franklinii,* and *C. tridecemlineatus.* (Revised from Howell.)

on which the respective fleas had the opportunity to become infected with plague and that on which they transmitted it were as follows: *O. bruneri,* 21 days, 30 days, 33 days, and 34 days; and *T. bacchi,* 23 days, 27 days, 29 days, and 32 days.

When these results are compared with those obtained under similar conditions with the rat flea (*Xenopsylla cheopis* (Roths)) and the California ground squirrel flea (*Diamanus montanus* (Baker)), which are generally regarded as highly efficient vectors, *O. bruneri* and *T. bacchi* may be regarded as equally capable vectors.

The significance of the possible role of these vectors in North and South Dakota in the dissemination of plague eastward becomes more apparent when the ranges of their three hosts are considered.

Richardson's ground squirrel is prevalent in areas which extend from western Montana to the western boundary of Minnesota, thence southward to a point near the northern boundary of Iowa. Franklin's ground squirrel is prevalent in North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, northern Missouri, Wisconsin, Illinois, and northwestern Indiana. Its range overlaps that of Richardson's ground squirrel, and the range of each of these is in turn overlapped by the 13-striped ground squirrel (fig. 1). Thus, a continuous chain of fleas capable of the transmission of plague, and of hosts which have been found infected or of others which are very probably susceptible to infection, extends from the Rocky Mountain States and western North Dakota, in which plague prevails, to the States east of the Mississippi River.

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THE TICK *ORNITHODOROS RUDIS* AS A HOST TO THE RICKETTSIAE OF THE SPOTTED FEVERS OF COLOMBIA, BRAZIL, AND THE UNITED STATES [1]

By GORDON E. DAVIS, *Senior Bacteriologist, United States Public Health Service*

The report of spotted fever in an epidemic form in a restricted area in Tobia, Colombia (Patiño, Afanador, and Paul, 1937), is of considerable interest inasmuch as spotted fever in the United States and in Brazil is endemic in character.

The presence of the argasid tick *Ornithodoros rudis* (= *O. venezuelensis* Brumpt) suggested a possible role for this tick in transmission, as another species of the genus, *O. parkeri*, is effective in the experimental transmission of spotted fever of the United States (Davis, 1939).

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

In October 1940 and June 1941, specimens of *O. rudis* which had engorged on guinea pigs ill with the Colombian disease were sent by Dr. Luis Patiño, Director of the Instituto Federico Lleras at Bogotá, to the Rocky Mountain Laboratory. Strains were established by the injection of a part of each lot into guinea pigs. With these strains and the progeny of one female from the first shipment, 16 transmission experiments have been carried out by test feedings and subsequently by test injections of ticks engorged on infected guinea pigs. Two similar experiments with the spotted fevers of Brazil and the United States are also reported. Laboratory strains of Rocky Mountain spotted fever were used for immunity tests. All injections were given intraperitoneally.

TABLE 1.—*Spotted fever of Colombia: transmission experiments with* Ornithodoros rudis

Experiment number	Date of infective feeding	Number of ticks	Number of test feedings	Tests by injection: Number of days after infective feeding	Tests by injection: Number of ticks	Tests by injection: Results	F1 generation
1	Dec. 28, 1940	6	5	343	1	Positive	
2	Feb. 7, 1941	16	5	185	5	do	161 ticks negative by feeding; 96 of these negative by injection.
				207	8	do	
3	Feb. 12, 1941	22	5	202	10	Negative	
				255	2	do	
4	Mar. 5, 1941	16	2 to 4	234	2	Positive	
5	Mar. 6, 1941	13	2 to 4	319	2	do	
6	Mar. 11, 1941	25	5	230	11	do	232 ticks negative by feeding; 139 of them positive by injection as first nymphs.
7	May 2, 1941	13	3	146	3	do	
8	May 29, 1941	75	3	93	6	do	
				96	42	do	
				146	5	do	
9	June 6, 1941	38	3	88	22	Negative	
				136	10	do	
10	June 7, 1941	25	3	87	20	Positive	
11	June 8, 1941	25	3	86	25	do	
12	June 17, 1941	38	1 to 2	77	23	do	
13	June 18, 1941	36	2	73	32	do	
14	Aug. 12, 1941	70	2 to 3	21	5	Negative	
				40	39	do	
15	Aug. 13, 1941	52	1 to 2	0	5	do	
				3	5	Positive	
				69	28	do	
16	As received.	16	4	70	2	do	
				101	1	do	

SPOTTED FEVER OF COLOMBIA

Using from 6 to 75 ticks for the infective feedings, 16 attempts were made to transmit the rickettsia of Colombian spotted fever by subsequent feedings on guinea pigs. All ticks were given from one to five test feedings but in no instance did the host become infected. In experiments 4 and 5 the same host was used for the infective feeding of two lots of ticks: in experiments 9, 10, and 11 one host was used for three lots, and in experiments 12 and 13, and 14 and 15, one host,

respectively, was used for each of two lots. Ticks used in experiments 3, 9, and 14 were found noninfective when subsequently injected. Samples from all other experimental lots injected from 3 to 343 days following the infective feeding caused typical infections. In experiment 6, ticks of the F1 generation were also infective when injected as first nymphs 98 days following the larval feeding.

SPOTTED FEVER OF BRAZIL

In similar attempts to transmit the spotted fever of Brazil, 22 and 25 ticks, respectively, were given an infective feeding on the same host. These ticks failed in transmission at four successive test feedings but were shown to harbor the rickettsia when injected after 191 and 190 days. Progeny resulting from the first oviposition were noninfective by feeding and by subsequent injection.

TABLE 2.—*Spotted fever of Brazil: transmission experiments with* Ornithodoros rudis

Experiment number	Date of infective feeding	Number of ticks	Number of test feedings	Tests by injection: Number of days after infective feeding	Number of ticks	Results	F1 generation
1	Oct. 18, 1941	22	4	128 191	7 6	Positive	76 ticks; no infection by feeding or by injection.
2	Oct. 19, 1941	25	4	127 190	9 4	do	80 ticks; no infection by feeding or injection.

SPOTTED FEVER OF THE UNITED STATES

Twenty-six larvae (Paraguay stock [2]) and 21 (Colombian stock) were given an infective feeding and the following day 22 larvae (Paraguay stock) and 16 (Colombian stock) engorged on the

TABLE 3.—*Spotted fever of the United States: transmission experiments with* Ornithodoros rudis

Experiment number	Infective feeding	Number of ticks	Number of test feedings	Tests by injection: Number of days after infective feeding	Number of ticks	Results
1	Apr. 7, 1941	47	4	243	30	Positive.
2	Apr. 8, 1941	38	4	242	22	Do.

[2] The Paraguay stock was received from Dr. E. Dias from the collection of Dr. H. de B. Aragão, of the Oswaldo Cruz Institute, Rio de Janeiro, Brazil, under the name *O. migonei* Brumpt 1936. This name has been made a synonym of *O. rudis* (Cooley, 1942).

same guinea pig. Four test feedings failed to cause infections in the host guinea pigs. Ticks from each lot tested by injection at 243 and 242 days, respectively, following the infective feeding caused a typical febrile reaction with scrotal edema and subsequent immunity in one guinea pig and 11 days of fever with extensive scrotal sloughing and death on the fifteenth day in the other.

DISCUSSION

Ixodid ticks that require several days for engorgement may remain on the infected host throughout the entire febrile period and thereby acquire any infectious agent present in the circulating blood at any time during this period. On the other hand, species of *Ornithodoros* that engorge in less than 30 minutes have a lesser chance of acquiring the infectious agent unless this short feeding period is coincident with the presence of the specific organism in the ingested blood. This is demonstrated in experiments 9, 10, and 11 on Colombian spotted fever, where one guinea pig was used as the infective host on 3 successive days. As judged by the results of subsequent injection, the ticks that fed on the first day failed to acquire the infectious agent while ticks that engorged on the following 2 days were successful. The same was true in experiments 14 and 15.

Although none of the ticks transmitted the disease agents by *feeding* on guinea pigs, ticks from 13 experiments on Colombian spotted fever caused the disease when *injected,* and in one instance (experiment 6) there was transmission through the eggs to the larvae and first nymphs as shown by the injection of the latter. Patiño has recently reported the conservation of the "virus" in *O. rudis* for 123 days. The ticks used in the two experiments on spotted fever of Brazil and two experiments on spotted fever of the United States also caused the respective diseases when injected.

The conservation within *Ornithodoros* ticks of certain infectious agents not transmitted by feeding is not unusual (Brumpt, 1936; Davis, 1939, 1940), but the transmission of such agents through the egg, so far as reported, is less common.

SUMMARY

The causative agents of the immunologically identical spotted fevers of Colombia, Brazil, and the United States are not transmitted by the bite of *O. rudis.*

The causative agent of spotted fever of Colombia was conserved in the tissues of the tick, as shown by injection, for 343 days and is transmissible through the egg to the next generation. Similarly, the agents of the spotted fevers of Brazil and the United States were conserved in the tick for 191 and 243 days, respectively.

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DEATHS DURING WEEK ENDED JUNE 19, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 19, 1943	Corresponding week, 1942
Data from 90 large cities of the United States:		
Total deaths	8,391	7,683
Average for 3 prior years	7,745	
Total deaths, first 24 weeks of year	233,348	211,629
Deaths under 1 year of age	574	555
Average for 3 prior years	536	
Deaths under 1 year of age, first 24 weeks of year	16,113	13,627
Data from industrial insurance companies:		
Policies in force	65,545,543	64,971,781
Number of death claims	12,646	10,518
Death claims per 1,000 policies in force, annual rate	10.1	8.4
Death claims per 1,000 policies, first 24 weeks of year, annual rate	10.4	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 26, 1943

Summary

The number of reported cases of poliomyelitis increased to 136 during the week, as compared with 99 for the preceding week, 41 for the corresponding week last year, and a 5-year (1938–42) median of 51 for the week. A rather sharp increase has been noted beginning with the week ended June 5. Of the current cases, 58 were reported in California and 39 in Texas, or more than two-thirds in these two States. A total of 894 cases has been reported to date this year—a larger number than for any prior year since 1934. Of the current accumulated total, 293 cases have been reported in California and 160 in Texas, or more than one-half in these two States.

The number of meningococcus meningitis cases increased from 327[1] to 335. Increases were reported in the North Central, East South Central, and Pacific areas. A total of 11,766 cases has been reported to date.

Reports of the other communicable diseases continue favorable. The incidence of the dysenteries, smallpox, and endemic typhus fever is slightly above that for last year, while a new minimum for typhoid fever has been recorded to date this year. The total number of measles cases reported so far this year is above both last year's figure and the 5-year median. Apparently a larger proportion of cases of German measles than usual is being reported this year, at least in certain cities. Reports from several localities indicate an unusual prevalence of rabies in animals.

A total of 8,918 deaths was reported in 88 large cities in the United States during the current week, as compared with 8,275 for the preceding week, and a 3-year average of 7,928. To date, 239,607 deaths have been recorded in these cities, as compared with 216,873 last year.

[1] Corrected figure.

Telegraphic morbidity reports from State health officers for the week ended June 26, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942	
NEW ENGLAND												
Maine	0	0	0				125	48	111	7	1	0
New Hampshire	1	0	0				7	5	9	2	0	0
Vermont	0	0	0				154	131	97	0	0	0
Massachusetts	3	2	2				1,009	676	711	18	12	1
Rhode Island	0	1	1				97	113	87	5	1	0
Connecticut	3	1	1	1	1	1	200	227	227	7	2	0
MIDDLE ATLANTIC												
New York	15	9	13	[1] 4	[1] 2	[1] 2	2,548	996	1,146	45	17	4
New Jersey	4	3	8	4	3	2	1,452	369	369	16	3	1
Pennsylvania	12	6	9		1		553	325	463	21	6	4
EAST NORTH CENTRAL												
Ohio	5	2	10	1	18	8	357	182	182	12	0	1
Indiana	4	2	3	1		1	146	63	63	9	1	1
Illinois	7	17	21	14	18	9	926	130	217	19	1	1
Michigan [2]	9	1	4	4	1	1	1,611	208	508	23	0	0
Wisconsin	0	0	4	9	12	12	1,665	892	954	6	1	0
WEST NORTH CENTRAL												
Minnesota	2	1	1				272	121	91	2	1	0
Iowa	0	1	1				85	193	141	0	0	0
Missouri	2	0	1				99	65	27	17	0	0
North Dakota	1	0	0	36	4	2	68	11	11	1	0	0
South Dakota	0	0	0				50	7	3	0	0	0
Nebraska	1	2	1		2		97	56	52	1	0	0
Kansas	1	1	4	4	1		126	68	123	2	0	0
SOUTH ATLANTIC												
Delaware	0	0	0				19	1	3	1	0	0
Maryland [2]	3	3	3	1		2	155	71	79	4	10	2
District of Columbia	0	2	1				60	42	42	2	2	1
Virginia	1	2	6	18	40	17	112	72	167	10	8	3
West Virginia	1	2	4		3	8	23	23	23	0	1	1
North Carolina	4	3	7	8			76	120	192	13	1	1
South Carolina	1	1	4	80	81	108	40	29	29	2	1	1
Georgia	2	4	6	12	14	13	26	42	58	3	0	0
Florida	0	3	3	6	7	4	33	76	45	5	0	0
EAST SOUTH CENTRAL												
Kentucky	3	4	4	2		4	42	13	63	3	1	1
Tennessee	5	4	3	6	18	10	66	16	48	4	0	0
Alabama	3	0	2	15	12	9	78	21	72	11	2	2
Mississippi [2]	2	1	1							0	2	1
WEST SOUTH CENTRAL												
Arkansas	3	2	2	1	8	8	22	23	23	4	1	0
Louisiana	3	7	7	1	5	5	13	54	17	1	1	0
Oklahoma	0	2	2	16	7	7	67	25	46	0	1	1
Texas	24	23	23	189	76	80	228	144	174	12	1	1
MOUNTAIN												
Montana	0	2	1				121	74	55	0	0	0
Idaho	0	0	0	5			74	38	9	6	0	0
Wyoming	0	0	0	7	42		49	18	8	0	0	0
Colorado	5	5	7	27	27	3	64	75	75	4	0	0
New Mexico	2	0	1	1	1		6	11	12	1	0	0
Arizona	2	0	2	44	14	21	20	34	34	0	0	0
Utah [2]	0	0	0	12	1		98	473	204	3	1	0
Nevada	0	0					1	19		0	0	
PACIFIC												
Washington	5	0	0	1	1		130	247	141	6	1	0
Oregon	2	0	1	2	3	4	59	80	80	3	3	0
California	19	8	15	77	28	28	693	1,968	511	24	29	2
Total	160	127	202	609	451	437	14,022	8,695	8.695	335	112	44
25 weeks	5,983	6,178	7,629	76,886	77.756	166,266	499,064	444,331	444,331	11,766	1,967	1,175

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 26, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942	
NEW ENGLAND												
Maine	0	0	0	14	8	7	0	0	0	0	0	0
New Hampshire	0	0	0	2	1	2	0	0	0	0	0	0
Vermont	0	0	0	6	2	2	0	0	0	0	0	0
Massachusetts	0	0	0	256	135	135	0	0	0	3	3	1
Rhode Island	0	0	0	25	5	5	0	0	0	0	0	1
Connecticut	3	0	0	44	12	29	0	0	0	1	1	1
MIDDLE ATLANTIC												
New York	6	3	1	189	167	316	0	0	0	7	13	10
New Jersey	1	0	0	35	55	70	0	0	0	1	4	2
Pennsylvania	1	0	0	85	113	163	0	0	0	4	4	7
EAST NORTH CENTRAL												
Ohio	1	0	1	62	101	101	0	1	0	7	6	4
Indiana	0	0	0	18	15	24	0	0	3	1	4	4
Illinois	0	3	2	87	87	173	0	0	5	4	2	4
Michigan [2]	0	2	2	52	99	208	0	0	1	12	0	3
Wisconsin	0	0	0	136	62	67	0	1	1	1	0	0
WEST NORTH CENTRAL												
Minnesota	0	1	1	19	20	23	0	0	1	0	0	0
Iowa	0	0	0	15	14	21	0	1	2	0	0	2
Missouri	1	1	0	14	13	25	0	0	0	0	1	6
North Dakota	0	0	0	5	6	6	0	0	0	0	0	0
South Dakota	0	0	0	3	13	6	0	1	1	0	0	0
Nebraska	0	0	0	5	6	10	0	0	0	0	0	0
Kansas	0	1	0	21	15	18	1	0	0	0	1	2
SOUTH ATLANTIC												
Delaware	0	0	0	1	9	5	0	0	0	1	2	0
Maryland [2]	0	1	0	27	22	22	0	0	0	2	2	1
District of Columbia	0	0	0	2	8	6	0	0	0	0	1	0
Virginia	1	0	2	10	7	7	0	0	0	5	7	5
West Virginia	0	0	1	11	13	15	0	0	0	4	4	4
North Carolina	0	1	1	11	5	13	0	0	0	1	10	10
South Carolina	1	0	0	1	0	2	0	0	0	1	0	6
Georgia	0	0	3	7	6	6	0	0	0	13	11	17
Florida	0	1	1	1	1	3	0	0	0	2	3	2
EAST SOUTH CENTRAL												
Kentucky	1	0	1	11	17	22	4	3	0	3	7	7
Tennessee	1	2	1	7	6	14	0	0	1	0	6	9
Alabama	2	2	2	3	3	4	0	0	0	2	2	8
Mississippi [2]	0	4	4	3	3	3	0	0	0	5	4	3
WEST SOUTH CENTRAL												
Arkansas	2	3	0	1	2	4	0	1	3	3	6	9
Louisiana	2	7	1	1	4	5	0	0	0	9	6	22
Oklahoma	8	0	1	9	1	7	0	0	0	2	8	8
Texas	39	1	2	28	25	18	0	0	0	18	21	24
MOUNTAIN												
Montana	0	0	0	2	9	8	0	0	0	0	0	1
Idaho	0	0	0	60	4	2	0	0	0	0	1	1
Wyoming	0	0	0	6	1	3	0	0	0	0	0	0
Colorado	0	1	0	24	0	17	0	2	2	3	4	4
New Mexico	2	0	0	2	4	4	0	0	0	0	3	1
Arizona	6	3	1	13	1	2	0	0	0	0	1	3
Utah [2]	0	1	0	13	7	5	0	0	0	0	2	1
Nevada	0	0	------	0	0	------	0	1	------	0	0	------
PACIFIC												
Washington	0	1	0	23	5	18	1	0	0	2	2	2
Oregon	0	0	0	10	7	7	2	0	2	1	0	1
California	58	2	7	129	78	107	0	1	1	6	3	5
Total	136	41	51	1,509	1,197	1,849	8	12	40	124	155	209
25 weeks	894	555	629	91,042	83,281	109,521	568	554	1,725	1,666	2,212	2,451

See footnotes at end of table.

532143°—43——4

Telegraphic morbidity reports from State health officers for the week ended June 26, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough, week ended June 26, 1943	Whooping cough, week ended June 27, 1942	Whooping cough, Median 1938–42	Week ended June 26, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	6	25	25	0	0	0	0	0	0	0	0	0
New Hampshire	4	2	2	0	0	0	0	0	0	0	0	0
Vermont	12	90	21	0	0	0	0	0	0	0	0	0
Massachusetts	96	186	144	0	0	0	0	0	0	0	0	0
Rhode Island	34	16	18	0	0	0	0	0	0	0	0	0
Connecticut	21	95	54	0	0	2	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	245	436	362	0	4	4	0	3	0	0	1	1
New Jersey	181	325	231	0	2	0	0	0	0	0	0	1
Pennsylvania	277	206	250	0	1	0	0	0	0	2	0	0
EAST NORTH CENTRAL												
Ohio	168	173	173	0	0	0	0	1	0	0	0	0
Indiana	60	43	24	0	1	0	1	0	0	0	0	0
Illinois	156	271	224	0	2	2	1	0	0	1	0	0
Michigan [2]	249	173	173	0	0	0	0	0	0	0	0	0
Wisconsin	225	169	169	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	48	39	39	0	2	0	0	0	0	0	1	0
Iowa	59	28	24	0	0	0	0	0	0	3	0	0
Missouri [2]	36	4	28	0	0	0	1	0	0	0	0	0
North Dakota	7	17	14	0	0	0	0	0	0	0	0	0
South Dakota	5	2	1	0	0	0	0	1	0	0	0	0
Nebraska	11	6	6	0	0	0	0	0	0	0	0	0
Kansas	88	46	56	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	12	2	7	0	0	0	0	0	0	1	0	0
Maryland [2]	148	55	64	0	0	0	1	0	0	6	0	0
District of Columbia	38	28	10	0	2	0	0	0	0	0	0	0
Virginia	190	51	99	0	0	0	125	0	0	3	2	0
West Virginia	86	23	33	0	0	0	0	0	0	1	0	0
North Carolina	273	128	155	0	0	1	0	0	0	1	0	2
South Carolina	70	40	72	0	0	45	0	0	0	0	2	0
Georgia	37	49	47	0	0	23	10	0	0	0	2	18
Florida	23	13	13	0	5	0	0	0	0	0	0	12
EAST SOUTH CENTRAL												
Kentucky	80	41	44	0	0	0	5	0	0	0	1	0
Tennessee	62	8	44	0	0	0	12	0	0	1	1	0
Alabama	96	29	40	0	0	0	0	1	0	0	0	5
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	1	2
WEST SOUTH CENTRAL												
Arkansas	31	17	25	0	2	23	0	0	0	0	9	0
Louisiana	13	14	32	1	0	4	0	0	0	0	0	2
Oklahoma	68	16	16	0	0	0	0	0	0	[3] 4	0	1
Texas	566	248	248	0	85	316	0	0	0	0	2	26
MOUNTAIN												
Montana	54	15	15	0	0	0	0	0	0	1	3	0
Idaho	1	7	7	0	0	0	0	0	0	1	0	0
Wyoming	0	3	5	0	0	0	0	0	0	2	0	0
Colorado	42	30	30	0	0	0	0	1	0	0	0	0
New Mexico	13	26	23	0	0	0	1	0	0	0	0	0
Arizona	27	12	31	0	1	0	28	0	0	0	0	0
Utah [2]	67	31	69	0	0	0	0	0	0	2	1	0
Nevada	0	0	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	53	16	61	0	0	0	0	0	0	1	0	0
Oregon	49	30	30	0	0	0	0	0	0	0	0	0
California	282	191	244	0	1	6	0	4	1	0	1	0
Total	4,369	3,475	3,862	1	108	426	185	11	1	[3] 30	27	70
25 weeks	101,969	95,277	98,028	34	917	5,718	1,552	274	18	160	465	1,204
25 weeks, 1942	------	------	------	40	488	2,849	1,553	218	32	187	486	954

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Exclusive of delayed report of 4 cases in Oklahoma during May.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 12, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	86	1	3	0	1	0	0	9
New Hampshire:												
Concord	0	0	------	0	0	0	2	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	0	225	10	13	0	122	0	2	20
Fall River	0	0	------	0	41	0	0	0	1	0	0	2
Springfield	0	0	------	0	33	0	1	1	29	0	0	1
Worcester	0	0	------	0	24	0	5	0	13	0	0	1
Rhode Island:												
Providence	0	0	------	0	6	1	0	1	19	0	0	28
Connecticut:												
Bridgeport	0	0	------	0	1	2	0	0	0	0	0	0
Hartford	1	0	------	0	18	0	5	0	1	0	0	0
New Haven	0	0	------	0	24	1	2	0	4	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	1	49	2	2	0	9	0	0	14
New York	8	0	2	2	1,449	42	72	3	207	0	3	73
Rochester	0	0	------	0	130	1	1	0	1	0	0	11
Syracuse	0	0	------	0	35	2	5	0	4	0	0	14
New Jersey:												
Camden	0	0	------	0	2	0	2	0	0	0	0	2
Newark	0	1	2	1	233	4	5	0	4	0	0	31
Trenton	1	0	------	0	8	0	4	0	3	0	0	0
Pennsylvania:												
Philadelphia	3	0	------	0	172	9	18	0	51	0	0	72
Pittsburgh	0	2	1	0	20	3	3	0	8	0	0	62
Reading	0	0	------	0	23	0	0	0	1	0	0	9
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	29	0	1	1	13	0	0	6
Cleveland	1	0	2	1	23	1	9	0	15	1	0	39
Columbus	0	0	------	0	40	0	1	0	2	0	0	2
Indiana:												
Fort Wayne	0	0	------	0	17	0	1	0	1	0	0	0
Indianapolis	1	0	------	0	78	3	1	0	13	0	0	11
South Bend	0	0	------	0	13	0	0	0	1	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	0	0	3	2	482	6	24	1	48	0	2	82
Springfield	0	0	------	0	2	0	0	0	0	0	0	3
Michigan:												
Detroit	0	0	------	0	1,167	13	10	0	21	0	0	98
Flint	0	0	------	0	84	0	0	0	3	0	0	12
Grand Rapids	0	0	------	0	98	0	0	0	6	0	0	27
Wisconsin:												
Kenosha	0	0	------	0	2	0	0	0	4	0	0	2
Milwaukee	0	0	------	0	443	1	1	0	107	0	0	83
Superior	0	0	------	0	45	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	1	71	0	0	0	3	0	0	4
Minneapolis	1	0	------	0	161	2	2	0	9	0	0	8
St. Paul	0	0	------	0	26	1	6	0	5	0	0	25
Missouri:												
Kansas City	0	0	------	0	44	2	7	0	13	0	0	9
St. Joseph	0	0	------	0	7	0	0	0	0	0	0	0
St. Louis	0	0	------	0	50	9	10	0	7	0	0	22
North Dakota:												
Fargo	0	0	------	0	0	0	0	0	0	0	0	0

City reports for week ended June 12, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	2	0	------	0	4	0	3	0	4	0	0	0
Kansas:												
Topeka	0	0	------	0	52	1	0	0	0	0	0	9
Wichita	0	0	------	0	5	1	6	0	2	0	0	7
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	10	0	1	0	0	0	0	2
Maryland:												
Baltimore	6	1	------	1	182	11	15	0	26	0	1	114
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	1	0	89	7	7	0	6	0	0	41
Virginia:												
Lynchburg	0	0	------	0	2	0	2	0	0	0	1	25
Richmond	1	0	------	0	18	1	1	0	1	0	2	11
Roanoke	0	0	------	0	0	0	0	0	0	0	0	1
West Virginia:												
Wheeling	0	0	------	0	0	0	0	0	0	0	0	0
North Carolina:												
Winston-Salem	0	0	------	0	2	0	1	0	0	0	0	32
South Carolina:												
Charleston	0	0	------	0	0	2	1	0	0	0	0	6
Georgia:												
Atlanta	0	0	7	1	9	1	1	0	3	0	1	3
Brunswick	0	0	------	0	1	0	3	0	0	0	0	0
Savannah	0	0	------	0	1	0	1	0	0	0	0	1
Florida:												
Tampa	0	0	------	0	2	0	1	0	0	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	1	25	2	2	0	1	0	0	10
Nashville	0	0	------	0	2	1	0	0	1	0	0	14
Alabama:												
Birmingham	0	1	5	0	14	0	1	0	1	0	0	1
Mobile	0	0	------	1	1	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	1	0	1	0	0	0	0	1
Louisiana:												
New Orleans	0	0	4	0	22	0	5	0	0	0	1	6
Shreveport	0	0	0	0	0	0	5	0	0	0	0	0
Texas:												
Dallas	3	0	1	1	1	1	1	2	2	0	0	6
Galveston	0	0	------	0	0	0	4	0	0	0	0	5
Houston	0	0	------	0	1	3	4	1	2	0	1	23
San Antonio	1	0	------	0	0	0	7	1	1	0	0	5
MOUNTAIN												
Montana:												
Billings	0	0	------	0	13	0	0	0	0	0	0	0
Great Falls	0	0	------	0	20	0	1	0	2	0	0	1
Helena	0	0	------	0	4	0	0	0	0	0	0	0
Missoula	0	0	------	0	2	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	10	1	59	1	7	0	8	0	0	10
Pueblo	0	0	------	0	3	0	0	0	3	0	0	7
Utah:												
Salt Lake City	0	0	------	0	49	1	1	0	5	0	0	31

City reports for week ended June 12, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza: Cases	Influenza: Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	5	0	------	0	136	2	7	0	3	0	0	12
Spokane	1	0	1	1	4	0	4	0	2	0	0	13
Tacoma	0	0	------	0	2	0	0	0	1	0	0	3
California:												
Los Angeles	5	0	11	0	0	4	10	5	19	0	0	45
Sacramento	0	0	------	0	1	1	3	0	2	0	0	6
San Francisco	2	0	2	1	69	1	11	0	12	0	2	49
Total	53	5	52	16	6,267	157	334	16	856	1	17	1,283
Corresponding week, 1942	65	1	26	8	4,003	32	222	1	722	0	22	1,286
Average, 1938-42	73	------	42	[1] 14	[2] 4,153	------	[1] 268	------	996	8	28	1,194

Dysentery, amebic.—Cases: New York, 2.
Dysentery, bacillary.—Cases: Buffalo, 8; New York, 3; Syracuse, 1; Charleston, S. C., 10; Los Angeles, 5.
Dysentery, unspecified.—Cases: San Antonio, 12.
Rocky Mountain spotted fever.—Cases: Cincinnati, 1; St. Louis, 2.
Typhus fever.—Cases: Tampa, 3.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,548,400)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza: Case rates	Influenza: Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
NEW ENGLAND	5.0	0.0	0.0	0.0	1,138	37.3	77.0	5.0	472	0.0	5.0	154
MIDDLE ATLANTIC	5.4	1.3	2.2	1.8	946	28.1	50.0	1.3	128	0.0	1.3	128
EAST NORTH CENTRAL	6.5	0.0	2.9	1.8	1,484	14.1	28.2	1.2	138	0.6	1.2	215
WEST NORTH CENTRAL	5.9	0.0	0.0	2.0	821	31.3	66.5	0.0	84	0.0	0.0	164
SOUTH ATLANTIC	12.4	1.8	14.2	3.5	561	39.0	60.3	0.0	64	0.0	10.6	419
EAST SOUTH CENTRAL	0.0	5.9	29.7	11.9	249	17.8	17.8	0.0	18	0.0	0.0	148
WEST SOUTH CENTRAL	11.7	0.0	14.7	2.9	73	11.7	79.2	11.7	15	0.0	5.7	135
MOUNTAIN	8.0	0.0	80.4	8.0	1,206	16.1	80.4	0.0	145	0.0	0.0	394
PACIFIC	22.7	0.0	24.5	3.5	371	14.0	61.2	8.7	68	0.0	3.5	224
TOTAL	8.0	0.8	7.8	2.4	946	23.7	50.4	2.4	129	0.2	2.6	194

PLAGUE INFECTION IN NEW MEXICO AND OREGON

Plague infection has been reported proved in pools of fleas and lice from mice and ground squirrels collected in New Mexico and Oregon as follows:

NEW MEXICO

Union County.—June 1, in a pool of 8 fleas from 11 grasshopper mice, *Onychomys leucogaster*, taken 9 miles south of Clayton on State Highway No. 18.

OREGON

Union County.—June 5, in a pool of 187 fleas and 15 lice from 93 ground squirrels, *C. oregonus*, taken 1 to 5 miles west of North Powder.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (*rodent*).—Five plague infected rats have been reported in Honokaa, Hamakua District, Island of Hawaii, T. H., as follows: One rat on April 24, 1943, 2 rats on April 26, 1 rat on April 29, and 1 rat on May 4, 1943.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 29, 1943.—During the week ended May 29, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		23		100	303	36	20	27	72	581
Diphtheria		11	1	15		4				31
Dysentery (bacillary)				2						2
German measles		19		14	210	10	13	37	29	332
Influenza		2			43	6	4		12	67
Measles		68		269	1,686	72	146	234	399	2,874
Meningitis, meningococcus					3		1		1	5
Mumps		48	4	61	775	78	49	90	117	1,222
Poliomyelitis					1	1				2
Scarlet fever		23	12	99	243	43	57	76	44	597
Tuberculosis (all forms)	10	8	8	120	48	18		3	20	235
Typhoid and paratyphoid fever				9				1		10
Undulant fever				1	2					3
Whooping cough				57	168	40	9	24	95	393

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Smallpox

Algeria.—For the period May 11–20, 1943, 24 cases of smallpox were reported in Algeria.

Typhus Fever

Algeria.—For the period May 11–20, 1943, 333 cases of typhus fever (35 in Europeans) were reported in Algeria.

Hungary.—For the period May 23–June 5, 1943, 37 cases of typhus fever were reported in Hungary.

Rumania.—For the period June 1-7, 1943, 159 cases of typhus fever were reported in Rumania.

Slovakia.—For the period May 16–22, 1943, 29 cases of typhus fever were reported in Slovakia.

Spain.—For the period April 11–27, 1943, 17 cases of typhus fever were reported in Spain.

COURT DECISIONS ON PUBLIC HEALTH

Typhoid fever—held to be accidental injury under workmen's compensation law.—(Maryland Court of Appeals; *Union Mining Co. et al.* v. *Blank*, 28 A.2d 568; decided October 29, 1942.) An employee contracted typhoid fever through drinking water furnished him by his employer. A laborer with buckets and dippers was provided by the employer and this laborer brought water at the expense of the employer from a spring about 400 or 500 feet away from the place of employment. This spring had been used with apparent immunity by the community for 100 years. The Maryland workmen's compensation law provided as follows: " 'Injury', 'personal injury' and 'accidental personal injury' means only accidental injuries arising out of and in the course of employment and such disease or infection as may naturally result therefrom, * * *." The question before the State court of appeals was whether the infection of the employee was an accidental injury within the meaning of such compensation statute.

The appellate court, after reviewing many cases from other jurisdictions, stated that the question had not before been precisely presented to it but that there were a number of Maryland cases bearing on certain phases of the subject. These latter cases were then cited and discussed, following which the court said that it would be seen that under the Maryland law "an accidental injury is one happening by chance or taking place unexpectedly or unintentionally; that the injury need not be created by wound or external violence; and that the conditions causing an injury do not have to be confined to a particular and single time and place, but may extend over a considerable period." The court's view was that an application of its previous decisions to the facts of the instant case showed that the acquisition of typhoid fever by the employee was accidental. According to the court, the finding of typhoid bacteria in the water was clearly unexpected and was something which the employee did not look for and had no reason to suppose existed. Under the definition given "accidental" by the court and by the majority of the other courts passing upon it, and also by the standard dictionaries, the introduction of the typhoid bacilli into the system of the employee was therefore accidental. The injury was the infection or the ulceration of the intestines by the bacilli and it clearly arose out of and in the course of the employment because the water was drunk by the employee while working and was furnished him by the employer as part of the working conditions.

The judgment of the lower court in favor of the employee was affirmed.

COURT DECISION ON PUBLIC HEALTH

Death from lead poisoning held compensable under workmen's compensation act.—(South Carolina Supreme Court; *Strawhorn* v. *J. A. Chapman Const. Co. et al.*, 24 S.E.2d 116; decided January 22, 1943.) The Workmen's Compensation Act of South Carolina defined "injury" and "personal injury" as meaning only "injury by accident arising out of and in the course of the employment" and as not including "a disease in any form, except where it results naturally and unavoidably from the accident." In a proceeding under the said act the State supreme court affirmed an award of compensation for the death from lead poisoning of a person employed as a house painter. The question was presented to the court as to whether the death was caused by accident or whether it was the result of a noncompensable disease. The deceased, who was taken ill suddenly, was 35 years old and of former good health and habits and had been a house painter for 15 years. According to the court the evidence indicated that an acute attack of lead poisoning was not to be expected by the deceased employee because of his years of former painting experience without such and the rarity of it. The conclusion was reached that there was evidence to support the finding that he had been subjected to lead from paint dust in an unusual or unexpected quantity and the holding was, therefore, that there was a compensable injury by accident. The element of surprise or improbability, said the court, necessary to constitute an accident in contemplation of law need only be in the result or effect of the happening. The court also stated that it did not matter that "such unusual and accidental inhalation merely aggravated deceased's prior dormant condition as a victim (if he was) of lead poisoning, for such aggravation, resulting in death, would make the latter compensable."

Inflammation of the eyes of the newborn—reporting.—(Ohio Court of Appeals; *Dietsch* v. *Mayberry*, 47 N.E.2d 404; decided May 18, 1942.) An action for damages was brought against the defendant, a physician, for alleged malpractice. The defendant was the attending physician at the plaintiff's birth on April 4, 1940. It appeared that the plaintiff's eyes were then swollen more than normal and that the nurses, at the defendant's direction, instilled the prophylactic required by the law of Ohio. On April 7 and 11 the defendant visited the plaintiff and at those times the latter's eyes were swollen and there was some discharge. Later one of the eyes ruptured and, when it failed to respond to treatment, was removed. In the trial court the judgment was for the defendant and the plaintiff appealed to the court of appeals.

One error assigned by the plaintiff on appeal was that the lower court, on the defendant's motion, withdrew from the jury's consideration as a ground of negligence the allegation of the petition that the defendant failed to report to the local health officer, as required by the statutes of Ohio, that the plaintiff was suffering from inflammation of the eyes of the newborn. The appellate court reviewed the statutory provisions concerning this condition and stated that these statutes had a twofold purpose: (1) To benefit the newborn by preventing blindness, and (2) to relieve the public generally from the burden another blind person would cast upon it. The holding of the court, with respect to the contention of the plaintiff, was that the latter was entitled to have the jury determine whether the defendant violated the statute as to reporting and, if so, to treat such violation as negligence per se.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 JULY 9, 1943 NUMBER 28

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Vol. 58 • JULY 9, 1943 • *No. 28*

INFLUENZA AND PNEUMONIA MORTALITY IN A GROUP OF 90 CITIES IN THE UNITED STATES, AUGUST 1935–MARCH 1943, WITH A SUMMARY FOR AUGUST 1920–MARCH 1943 [1]

By MARY GOVER, *Associate Statistician, United States Public Health Service*

Weekly mortality from influenza and pneumonia is probably the best available measure of the occurrence and extent of influenza epidemics. Two other indices of influenza epidemics are readily available, namely, deaths from all causes and reported cases of influenza Influenza epidemics in the past have been of such magnitude and have occurred in such close sequence in different geographic sections that they are easily discernible in weekly mortality rates from all causes (*1*) On the other hand, the number of reported cases of influenza is markedly deficient and at the time of an epidemic the increase in reported cases frequently lags behind the increase in deaths from influenza and pneumonia Current reports of influenza cases for consecutive weeks, however, show the occurrence of influenza epidemics and the areas of the country affected by the epidemic.

During the fall and winter months of 1942 cases of influenza reported by attending physicians to local health departments and assembled by the State health departments and the United States Public Health Service (*15*) showed an incidence somewhat in excess of the median for the same weeks as based on the 5 previous years. From September to November, inclusive, reported cases of influenza were only slightly in excess of the number reported for the same months of 1941 but they were 15 to 60 percent above the 5-year median as computed for corresponding monthly intervals. From December 1942 through March 1943 the number of reported cases has not varied significantly from the 5-year median for corresponding months.

Sickness absenteeism among industrial workers as reported by sick benefit associations to the Public Health Service (*4*) shows an excess

[1] From the Division of Public Health Methods, National Institute of Health

in the third and fourth quarters of 1942 over the same period of 1941 of 18 and 44 percent, respectively, in the rates for all respiratory diseases; the excess for pneumonia was 50 and 138 percent, for influenza and grippe 40 and 54 percent, and for bronchitis 12 and 27 percent in the third and fourth quarters, respectively.

Weekly mortality from all causes in cities of 100,000 or more population as issued by the Bureau of the Census (*13*) showed a marked excess throughout the last quarter of 1942 and the first quarter of 1943 over the 3-year average for corresponding weeks of 1939–41 and 1940–42. As far back as the first of June, mortality from all causes was somewhat above the level of this 3-year average. However, mortality in these large cities has not shown definite peaks that could be interpreted as epidemics. Nor does an examination of the rates for individual cities reveal a weekly excess that could be considered as a local influenza outbreak in any of the cities. Quarterly rates of mortality (annual basis) from all causes in these cities for the quarters of 1942–43 as compared with the same quarters of the 2 preceding years are as follows:

Year	3d quarter July–September	4th quarter October–December	1st quarter January–March	2d quarter April–June
	Annual rate per 1,000 [1]			
1940–41	10.6	11.4	13.1	11.4
1941–42	10.3	11.3	12.5	11.1
1942–43	10.4	12.1	13.6	----------

[1] The rates for 1940 are based on the enumerated population (April 1, 1940); those for 1942 and 1943 are based on an estimate of the civilian population of metropolitan areas made by the Bureau of the Census from sugar registration figures (May 1, 1942); those for 1941 are an average of the populations for 1940 and 1942. The Bureau of the Census release states that the sugar registration data are probably the most reliable indicator of population changes which have taken place by reason of the withdrawal of men to the armed forces and the migration of population to cities engaged in war activities. Deaths are taken from the Weekly Mortality Index (*13*).

The table shows that in the third quarter (July–September) the rate for 1942 was substantially the same as that for 1941 although a slight decline might have been expected on the basis of pneumonia trends since 1937 (*6*); in the fourth quarter (October–December) the rate for 1941 was also practically the same as for 1940, but for 1942 it was 7 percent higher than for 1941; in the first quarter the rate for 1942 was 5 percent lower than for 1941, and for 1943 it was 9 percent higher than for 1942.

Mortality rates for whole States probably involve less error due to migration of population than do rates for cities. The following table based on preliminary reports from health departments of 35 States and the District of Columbia contains mortality rates during

the third and fourth quarters of 1940, 1941, and 1942 for all causes and for selected specific causes:

Quarter year	All causes	Tuberculosis (all forms)	Influenza	Pneumonia	Cancer	Diabetes	Cerebral hemorrhage	Heart disease	Nephritis	Auto accidents	All other accidents
	Annual rate per 100,000 [1]										
Third quarter:											
1940	902	42.5	3.2	28.0	118.7	23.2	80.8	252.8	68.6	25.7	49.2
1941	956	41.0	2.7	26.0	120.5	22.1	78.1	253.2	64.7	30.7	49.4
1942	961	39.9	2.4	27.1	123.3	22.7	81.4	261.8	64.0	19.4	49.9
Fourth quarter:											
1940	1,042	41.4	10.7	53.0	119.4	26.5	87.9	290.5	74.9	31.3	42.7
1941	1,023	40.2	7.0	42.5	122.0	24.6	87.7	290.7	71.6	34.3	42.8
1942	1,102	41.1	8.2	50.5	127.2	27.3	99.4	327.7	75.2	19.6	51.4

[1] Rates are based on preliminary reports from health officers and published by the Public Health Service as an annual report of current morbidity and mortality (*14*).
The rates for 1940 are based on the enumerated population (Apr. 1, 1940); those for 1942 are based on an estimate of the civilian population of States made by the Bureau of the Census from sugar registration figures (May 1, 1942); those for 1941 are an average of the populations for 1940 and 1942.

The rates for all causes show the same relationships in States as in cities; namely, the third quarter of 1942 had a slightly higher rate of mortality than the same quarter of 1941, while the fourth quarter of 1942 had a rate which was 8 percent higher than the same quarter of 1941. For the fourth quarter all of the specific causes included in the table except automobile accidents were higher in 1942 than 1941; all accidents exclusive of automobile accidents were 20 percent higher, influenza and pneumonia 19 percent, cerebral hemorrhage and heart disease 13 percent, diabetes 11 percent, nephritis 5 percent, cancer 4 percent, and tuberculosis 2 percent higher in 1942 than in 1941.

Mortality data from all causes in 45 States and the District of Columbia are available in preliminary reports issued by the Bureau of the Census (*12*). Rates by geographic section for the third and fourth quarters of 1940, 1941, and 1942 and the first quarter of 1941, 1942, and 1943 are as follows:

Quarter year	45 States and D. C.	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
	Annual rate per 1,000 [1]									
Third quarter:										
1940	9.9	10.5	10.1	10.1	9.5	9.6	9.7	9.2	9.9	10.7
1941	9.9	10.2	10.1	10.2	9.8	9.8	9.5	8.9	9.9	10.7
1942	9.7	10.5	10.1	9.7	9.5	9.8	8.7	8.4	9.7	10.9
Fourth quarter:										
1940	9.9	11.5	10.3	10.0	9.4	9.6	9.1	8.5	10.0	11.2
1941	9.9	11.1	10.1	10.0	9.5	9.5	9.1	8.6	9.8	11.1
1942	10.2	12.1	11.4	10.1	9.8	9.3	8.7	8.7	10.2	11.4
First quarter:[2]										
1941	12.0	13.9	12.4	11.8	11.5	12.4	12.3	10.9	10.7	12.2
1942	11.5	12.2	12.0	11.9	11.2	10.9	10.8	10.1	11.3	12.5
1943	11.9	15.1	13.2	11.7	11.8	11.0	10.4	10.1	11.7	13.7

[1] The rates are computed from deaths from all causes as released by the Bureau of the Census (*14*); the population for 1940 is the enumerated population (Apr. 1, 1940); for 1942 an estimate of the civilian population of States made by the Bureau of the Census from sugar registration figures (May 1, 1942); and for 1941 an average between the populations for 1940 and 1942.
[2] Rates for the first quarter are based on 41 States and the District of Columbia.

Mortality from all causes for 45 States shows a small excess (3 percent) in the fourth quarter of 1942 and in the first quarter of 1943 compared with the same quarters of 1941 and 1942, respectively; for States the excess is largely confined to the New England and Middle Atlantic sections, although there is a slight excess in the West North Central, Mountain, and Pacific sections also.

WEEKLY INFLUENZA AND PNEUMONIA MORTALITY IN A GROUP OF ABOUT 90 CITIES, AUGUST 1920 TO MARCH 1943

Weekly influenza and pneumonia mortality in a group of cities of the United States from 1920 to 1935 was summarized in previous papers (*2*, *3*). The present paper brings this summary up to date with special reference to the trend of pneumonia mortality. The data are weekly records of deaths from influenza and pneumonia in groups of cities in nine geographic sections of the United States [2] Although outbreaks of influenza are clearly visible in weekly rates of mortality from influenza and pneumonia, as shown in the continuous line in figure 1, some measure of excess deviation from normal seasonal or expected rates is useful in an examination of influenza epidemics. The details of the methods used to derive the normal seasonal expectancy, shown as a dotted line in figure 1, are outlined in the appendix. It should be noted, however, that changes in the annual levels of the rates from 1930 to 1935 made it necessary to adjust the norm to changing annual levels; and with the much sharper decline since 1937 with what amounted to a somewhat changing seasonal curve, it seemed necessary to fit the norm to quarterly levels, exclusive of definite epidemic weeks. Prior to 1930 the seasonal norm was an unchanging level based on medians of corresponding weeks of the 7 years 1921–27. Therefore, prior to 1930, figure 1 indicates periods when the rates were generally below (1920–21) or generally above (1925–26) the median rates, even when there was no definite epidemic. Since 1930, however, the figure indicates only epidemic deviations from the norm and does not indicate years, quarters, or other extended periods when respiratory disease mortality was generally below or above expectancy but was not epidemic. These facts should be remembered in connection with deviations from the normal seasonal expectancy as shown in figure 6.

Figure 1 shows the course of weekly mortality from influenza and pneumonia in the whole group of cities from August 1920 to March 1943. Although the general level of influenza and pneumonia mortal-

[2] Weekly reports of deaths are made to the Division of Sanitary Reports and Statistics of the U. S Public Health Service from city health departments selected to give representation to each geographic section of the United States. Among the cities originally reporting whose records were used in previous papers (approximately 95 cities), 90 were selected in January 1941 which sent regular reports. The 90 cities used in the present report, 1935-43, have an aggregate population of 34,000,000, they are listed by geographic section in the appendix.

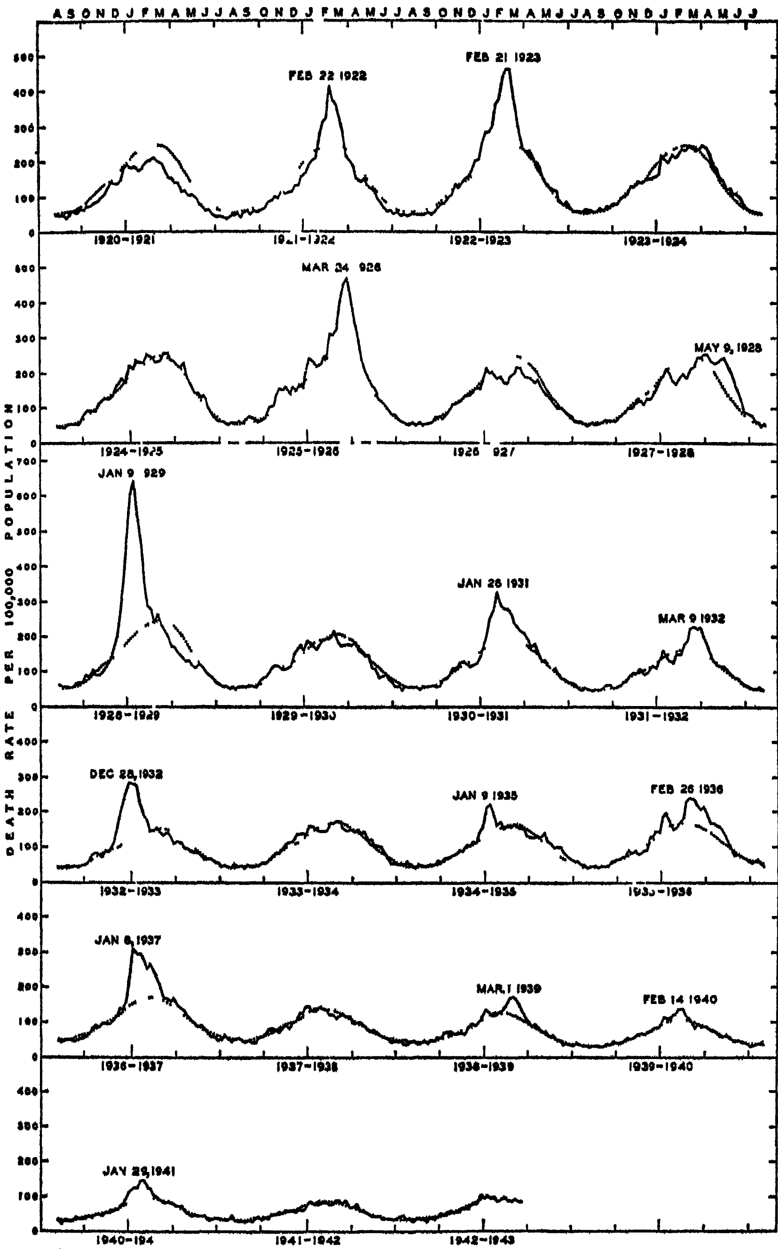


FIGURE 1.—Weekly mortality (annual basis) from influenza and pneumonia in a group of about 90 cities in the United States, August 1920-March 1943 Dates are middle (Wednesday) of peak weeks The dotted line is the seasonal *norm* from which epidemic excess mortality was obtained. (See appendix for method of computation.)

ity has varied from year to year the downward trend of the rates is not marked (fig. 1) until the winter of 1937–38. Since then, however, pneumonia seasonal levels have definitely declined, as may be seen by a comparison of the actual rates for the winter of 1941–42 with those for 1937–38. Influenza epidemics of various sizes occurred in all but 9 out of the 23 years shown in figure 1. The three epidemics since the winter of 1937–38 were of minor intensity; the total excess mortality rates in two of the winters, 1938–39 and 1940–41, are about equal to those of the winter of 1934–35; while the total excess for the epidemic of the winter of 1939–40 was the smallest that has occurred in the last 23 years (table 1). No epidemic excess is seen in the weekly rates for the year 1942–43 (fig. 1).

TABLE 1.—*Total excess*[1] *death rate (actual basis) per 100,000 from influenza and pneumonia during the whole of each epidemic in cities of nine geographic sections of the United States, August 1920–March 1943*

Epidemic of[2]—	All cities	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1921–22	18.3	29.5	24.7	11.4	34.8	9.4	16.0	14.6	36.2	36.3
1922–23	29.9	36.6	26.5	32.2	53.3	42.7	44.0	6.7	17.6	11.3
1925–26	25.3	30.0	41.2	22.2	None	26.2	38.2	58.8	16.8	9.3
1927–28	11.6	15.4	20.9	17.9	4.9	None	11.9	13.7	7.7	None
1928–29	44.4	42.3	43.0	43.7	42.8	47.6	92.0	68.2	68.7	43.0
1930–31	16.4	13.8	24.3	9.7	14.0	27.2	None	17.7	None	None
1931–32	7.4	None	13.5	4.6	19.4	8.0	8.6	7.2	24.1	None
1932–33	19.2	22.8	18.1	13.8	42.7	22.1	33.9	41.1	34.7	16.7
1934–35	5.4	8.1	5.8	6.3	11.1	14.5	28.3	10.7	13.4	None
1935–36	12.5	16.9	7.1	5.7	24.0	10.7	61.1	28.9	None	4.5
1936–37	18.4	25.3	11.4	16.1	27.0	17.7	41.2	24.5	68.0	31.0
1938–39	5.2	5.2	2.9	11.8	9.2	None	8.7	None	None	None
1939–40	1.9	None	None	None	6.2	5.8	6.5	13.5	None	None
1940–41	5.4	12.4	4.1	1.9	7.2	5.6	15.2	13.2	15.6	8.7

[1] See appendix for the method of computing death rates in excess of a normal or expected rate.
[2] Each yearly interval begins with the 32d calendar week and ends with the 31st calendar week (early August) of the year following.

TABLE 2.—*Mortality from influenza and pneumonia in the U. S. Registration States, 1900–1941, and for a total of about 90 cities, 1920–1942*

Year	Rate[1] in registration States	Year	Rate[1] in registration States	Year	Rate[1] in— Registration States	Rate[1] in— Cities	Year	Rate[1] in— Registration States	Rate[1] in— Cities
1900	202.2	1910	155.9	1920	207.3	232.8	1930	102.5	119.2
1901	197.2	1911	145.4	1921	98.7	110.8	1931	107.5	128.9
1902	161.3	1912	138.4	1922	132.3	146.1	1932	107.3	115.9
1903	169.3	1913	140.8	1923	151.7	170.7	1933	95.7	101.6
1904	192.1	1914	132.4	1924	115.2	143.9	1934	96.9	103.1
1905	169.3	1915	145.9	1925	121.7	148.1	1935	104.2	106.8
1906	156.3	1916	163.3	1926	141.7	166.7	1936	119.6	119.9
1907	180.0	1917	164.5	1927	102.2	123.4	1937	114.9	118.9
1908	150.9	1918	588.5	1928	142.5	158.8	1938	80.4	82.2
1909	148.1	1919	223.0	1929	146.5	162.6	1939	75.7	76.5
							1940	70.3	66.9
							1941	63.7	62.7
							1942	------------	58.5

[1] Annual rate per 100,000 population.

The course of influenza and pneumonia mortality as given for the Registration States by the Bureau of the Census for 1900 to 1941 and also for the group of cities from 1920 to 1942 is shown in table 2 and plotted on a logarithmic scale in figure 2. The rates[3] are for calendar years and include all deaths during both epidemic and nonepidemic periods. The course of influenza and pneumonia mortality (fig 2) was downward in the Registration States prior to the influenza epidemic of 1918–19; from 1920 to 1930 there was some variability in the annual rates but not much trend is discernible; 1930 to 1935, inclusive, were relatively low years of influenza and pneumonia mortality; in 1936–37 there was some increase in the rates; beginning with the year 1938

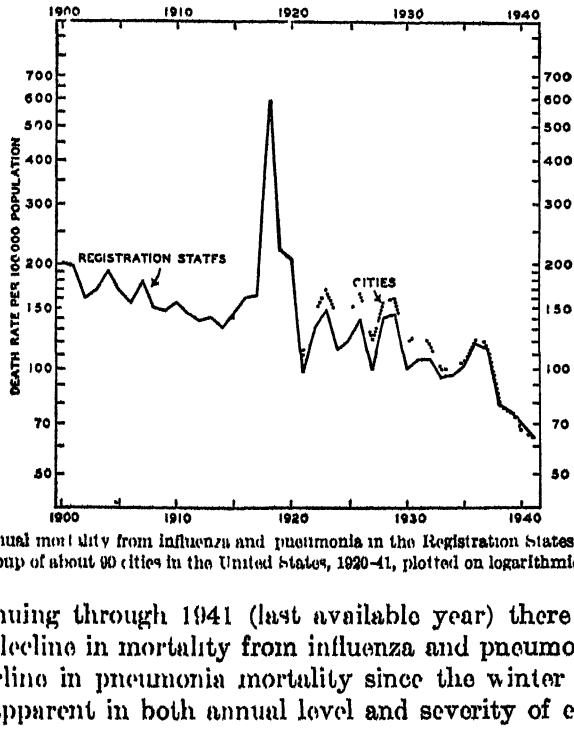


FIGURE 2 —Annual mortality from influenza and pneumonia in the Registration States, 1900–1941, and in a group of about 90 cities in the United States, 1920–41, plotted on logarithmic scale

and continuing through 1941 (last available year) there was an accelerated decline in mortality from influenza and pneumonia.

The decline in pneumonia mortality since the winter of 1937–38, which is apparent in both annual level and severity of epidemics, is associated with a decline in case fatality rather than incidence. Reported cases of pneumonia for New York (*9*) and Massachusetts (*5*) show some variability but remain practically level from 1930 to 1940. Pneumonia incidence in the U. S. Army (*10*) increased during 1935 to 1940. Among industrial workers (*8*) also, pneumonia morbidity has increased during the 8 years 1935 to 1942, which may be partially attributed to the influx of new workers particularly in the iron and steel

[3] In all tables the weekly rates for cities for the years since 1940 are based on populations estimated from sugar registration estimates for metropolitan areas as issued by the Bureau of the Census. Rates for the Registration Area are based on official Census population estimates.

industries. Pneumonia case fatality, however, has declined since 1933 in the U. S. Army. The Annual Report of the Surgeon General, U. S. Army (1941, p. 62) gives a table of case fatality rates which shows a decline from an average of 12.5 percent in 1929–31 to an average of 5.1 percent in 1937–39 with a further drop to 0.7 percent in 1940. The report for 1940 states that starting in 1935 there was a greater use of oxygen and serum therapy; the use of sulfa drugs was begun in 1938 and increased in 1939. With respect to the extent of use of sulfa drugs among the general population the Metropolitan Life Insurance Company (*14*) reports the results of an investigation made in the early months of 1941 of pneumonia deaths of industrial policyholders. Among those dying from lobar pneumonia, 84.3 percent had received chemotherapy and 11.5 percent had received both chemotherapy and serum.

TABLE 3.—*Mortality from influenza and pneumonia in cities of nine geographic sections of the United States, 1920–42*

Year [1]	All cities	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
	Annual rate per 100,000 including epidemic [2]									
1920–21	112.6	119.9	121.6	89.6	111.1	134.2	131.3	115.4	171.5	72.3
1921–22	139.1	144.4	152.2	104.9	153.2	152.3	164.7	135.3	190.6	128.6
1922–23	170.8	163.7	169.9	157.9	169.7	220.3	240.7	163.1	191.9	115.0
1923–24	141.8	116.7	155.9	113.4	108.2	185.6	217.1	174.5	167.7	111.1
1924–25	145.8	133.7	159.2	122.5	95.4	179.9	217.5	180.5	176.9	124.2
1925–26	172.0	163.4	195.4	147.1	96.4	204.5	253.1	233.5	173.1	111.1
1926–27	126.0	121.3	141.1	104.1	85.7	153.8	149.4	149.3	158.3	111.0
1927–28	142.1	129.7	157.9	128.3	88.9	152.1	205.4	192.3	160.7	110.6
1928–29	176.6	157.8	184.4	154.8	143.5	202.5	283.4	226.5	224.3	154.6
1929–30	123.6	109.7	136.9	97.1	116.1	139.9	188.6	180.2	153.3	83.7
1930–31	134.3	119.3	156.1	98.5	132.1	179.2	184.1	104.6	148.3	79.2
1931–32	107.3	106.5	119.5	78.0	120.3	137.7	124.3	122.6	142.9	79.4
1932–33	107.7	106.5	110.0	77.9	152.5	135.6	141.3	167.6	159.0	83.5
1933–34	104.1	113.0	108.8	83.9	120.1	137.4	149.3	133.8	104.0	61.0
1934–35	106.5	112.3	101.0	90.9	130.0	152.1	154.6	148.8	135.7	66.3
1935–36	117.4	126.6	104.3	98.5	130.5	160.5	210.2	200.9	145.9	88.0
1936–37	122.2	136.5	107.2	101.3	124.3	163.0	195.7	197.6	193.7	115.1
1937–38	86.5	106.1	77.1	69.2	84.7	126.2	128.1	147.0	132.7	68.2
1938–39	82.4	100.3	68.8	74.9	91.9	103.4	121.8	146.9	111.7	62.6
1939–40	68.1	80.5	56.1	55.9	78.0	101.5	116.9	135.7	97.4	48.4
1940–41 [3]	64.2	79.1	55.7	50.8	79.6	88.6	97.8	112.1	98.6	43.8
1941–42 [3]	55.1	71.5	47.7	41.7	61.6	76.5	83.2	96.1	80.9	47.8

[1] Each yearly interval begins with the 32d calendar week and ends with the 31st calendar week (early August) of the year following.
[2] Annual rates excluding epidemics (plotted in fig. 3) can be obtained by subtracting the excess rates given in table 1 from the total rates as given in this table.
[3] Rates for the calendar years 1941 and 1942 are based on populations estimated from sugar registration data, issued by the Bureau of the Census. Annual rates are averages of 52 weekly rates.

Table 3 and figure 3 show the course of influenza and pneumonia mortality in the group of 90 cities for summer-to-summer annual rates both including all epidemic excess deaths and also with epidemic excess deaths removed. Table 4 and figure 4 show the course of influenza and pneumonia for the 90 cities for each quarter separately; in this chart epidemic excess deaths are excluded. For both quarterly and annual rates an accelerated decline begins about 1938. The decline

is at approximately the same rate in the first, second, and fourth quarters but is at a somewhat slower rate for the third quarter (July–September). For all quarters except the first the rates appear to be leveling off beginning with about 1941. The fourth quarter of 1942 and the first quarter of 1943 show a definite increase in influenza-pneumonia mortality.

In the third and fourth quarters (July-September and October–December, respectively) of 1942 and the first quarter (January–March) of 1943 influenza and pneumonia mortality was higher than it was in any of the 3 preceding years, during which pneumonia mortality was declining. The excess in the rate for the third quarter of 1942 over

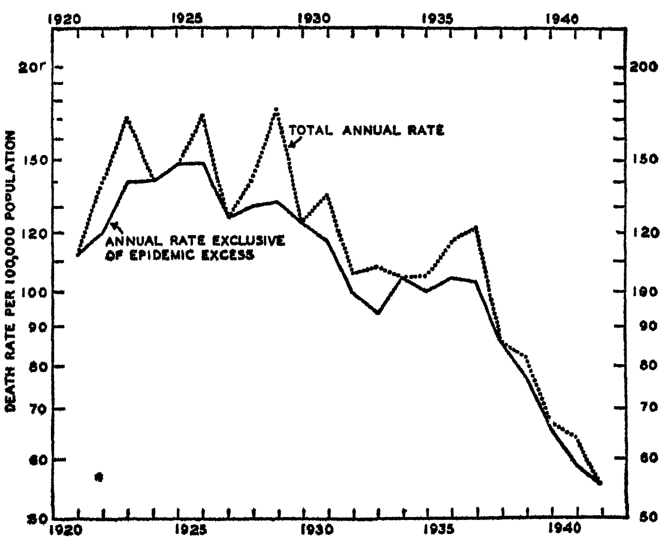


FIGURE 3.—Annual (August to July) mortality from influenza and pneumonia in a group of about 90 cities in the United States, August 1920 to July 1942, plotted on logarithmic scale. The dotted line represents a total annual rate, the solid line an annual rate exclusive of epidemic excess mortality.

the same quarter of 1941 was 6 percent; but this is not a larger excess for this quarter than has occurred in other successive years since 1920 (table 4). However, the excess in the rate for the fourth quarter of 1942 and the first quarter of 1943 over the rate for the same quarters of 1941 and 1942 was 22 and 15 percent, respectively, which, with one exception, is slightly larger than any corresponding annual percentage increase for these quarters since 1920, with epidemic excess removed. The returns from a 10-percent sample of current mortality in the United States published by the Bureau of the Census (*11*) indicated that from August to December pneumonia and influenza mortality maintained a high level in relation to the normal seasonal expectancy and that during January it dropped below the expected value for that month.

TABLE 4.—*Quarterly mortality from influenza and pneumonia in a total of about 90 cities, 1920–42*

Year[1]	3d quarter[1]	4th quarter[1]	1st quarter[1]	2d quarter[1]	Year[1]	3d quarter[1]	4th quarter[1]	1st quarter[1]	2d quarter[1]
Quarterly rate (annual basis) per 100,000, exclusive of epidemic excess									
1920–21	51.8	111.9	188.9	100.2	1932–33	47.6	89.2	137.2	83.1
1921–22	49.4	104.8	206.2	120.5	1933–34	46.9	103.6	157.9	106.5
1922–23	51.2	125.2	231.7	151.0	1934–35	50.0	93.4	152.5	108.5
1923–24	63.0	125.4	222.3	157.1	1935–36	50.5	98.5	163.4	105.5
1924–25	58.2	138.1	240.4	147.5	1936–37	51.4	100.0	161.3	96.2
1925–26	63.3	141.1	237.5	144.6	1937–38	50.2	95.6	129.1	74.3
1926–27	59.1	124.4	191.0	127.7	1938–39	45.0	80.3	121.3	65.0
1927–28	58.0	113.9	205.1	142.5	1939–40	36.6	62.3	104.1	61.0
1928–29	63.0	125.7	221.9	119.1	1940–41[2]	36.3	56.6	90.3	52.0
1929–30	59.0	124.7	187.1	124.5	1941–42[2]	35.3	54.0	81.1	49.7
1930–31	56.5	108.6	187.1	119.9	1942–43[2]	37.3	65.8	93.2	....
1931–32	53.9	89.1	151.9	106.4					

[1] The calendar weeks included in each quarter of a year are as follows:
3d quarter: 27th–39th week (July–September).
4th quarter: 40th–52d or 53d week (October–December).
1st quarter: 1st–13th week (January–March).
2d quarter: 14th–26th week (April–June).

[2] Rates for the years 1941 and 1942 are based on populations estimated from sugar registration data, issued by the Bureau of the Census.

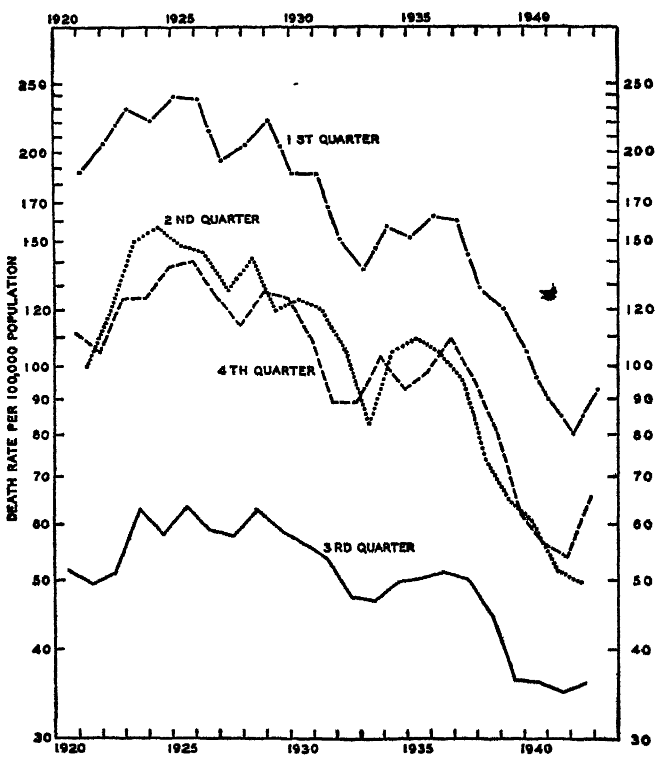


FIGURE 4.—Quarterly mortality (annual basis) from influenza and pneumonia exclusive of epidemic excess mortality in a group of about 90 cities in the United States, July 1920 to December 1942, plotted on logarithmic scale. The third quarter includes the 27th to the 39th week (July to September); the fourth quarter the 40th to the 52d or the 53d week (October to December); the first quarter the 1st to the 13th week (January to March); and the second quarter the 14th to the 26th week (April to June).

INFLUENZA AND PNEUMONIA MORTALITY IN CITIES OF NINE GEOGRAPHIC AREAS, 1935–42

Figure 5 and table 3 show the trend of influenza and pneumonia mortality in each of nine geographic sections. The dotted line represents the total annual rate (August to July); the solid line is exclusive of epidemic excess. The rates with epidemic excess removed show a decline in each section, with an increased rate of decline beginning with the year 1937–38.

Table 5 gives influenza and pneumonia mortality rates (annual basis) for 3-month periods from July 1940 to March 1943 for cities grouped in nine geographic sections. For all of the sections in the first quarter of 1941 and for four sections in the fourth quarter of 1940 two sets of rates are given in the table, that is, both including and excluding epidemic excess rates. In the third quarter of 1942 the New England, South Atlantic, East South Central, and Pacific sections had pneumonia rates which were significantly higher than in the same quarter of 1941; in the fourth quarter all sections except the West South Central and possibly the Mountain had significantly higher influenza and pneumonia rates in 1942 than in 1941; and in the first quarter all sections except the South Atlantic, East South Central, and the Pacific had significantly higher rates in 1943 than in 1942.

Weekly excess influenza and pneumonia mortality for a total of all cities and for cities of nine geographic areas is shown in figure 6. The vertical broken lines on the chart represent the middle of the

TABLE 5.—*Quarterly mortality from influenza and pneumonia in cities of nine geographic sections of the United States, July 1940 to March 1943*

Quarter year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
	Quarterly rate (annual basis) per 100,000 [1]								
3d quarter: [2]									
1940	43.5	32.3	27.6	49.0	45.0	48.6	67.8	56.7	26.7
1941	37.5	32.9	25.3	46.0	42.7	48.8	75.1	51.1	20.3
1942	45.5	34.4	25.6	44.5	49.9	52.1	72.5	48.7	31.2
4th quarter: [2]									
1940: epidemic excess included	73.5	44.4	49.5	74.0	70.0	70.9	103.1	133.7	57.5
1940: epidemic excess excluded	73.5	44.4	49.5	73.2	70.0	70.9	94.6	125.8	36.1
1941	67.6	47.2	42.0	59.3	71.5	77.8	104.4	89.8	38.7
1942	90.6	56.9	49.4	74.9	97.5	92.3	89.1	97.9	57.5
1st quarter: [2]									
1941: epidemic excess included	143.2	96.4	84.4	129.8	166.4	203.8	193.8	155.3	59.5
1941: epidemic excess excluded	93.4	79.9	76.8	102.7	143.9	143.0	149.4	100.6	46.3
1942	100.3	69.7	62.4	85.9	126.2	137.5	128.3	93.7	72.3
1943	132.3	81.4	69.7	115.2	130.0	133.9	151.4	116.2	71.9
2d quarter: [2]									
1941	60.0	48.3	41.7	63.2	77.3	72.9	83.2	55.5	30.7
1942	81.6	41.1	38.3	56.8	59.9	66.7	75.9	83.4	50.4

[1] Rates for the years 1941 and 1942 are based on populations estimated from sugar registration data, issued by the Bureau of the Census.
[2] The calendar weeks included in each quarter of a year are as follows:
3d quarter: 27th–39th week (July–September).
4th quarter: 40th–52d or 53d week (October–December).
1st quarter: 1st–13th week (January–March).
2d quarter: 14th–26th week (April–June).

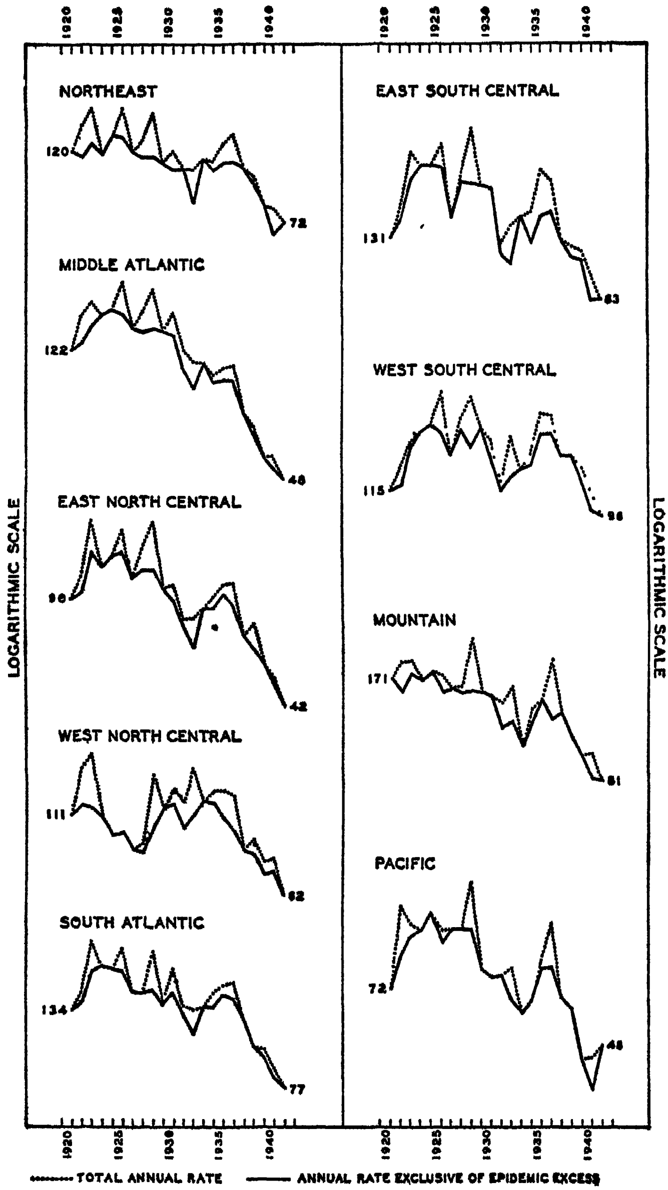


FIGURE 5.—Annual (August to July) mortality from influenza and pneumonia in cities of nine geographic sections of the United States, August 1920 to July 1942. The dotted line represents total annual rates; the solid line annual rates exclusive of epidemic excess mortality. Numbers at ends of lines are rates for first and last year.

median week of each epidemic, computed from the excess rates for all sections combined.

During the winters of 1935–36 and 1936–37 influenza epidemics reached fair proportions in some of the sections. In 1936–37 the East South Central, West North Central, West South Central, Mountain, and Pacific sections had maximum excess weekly rates (annual basis) of 300 to 700 per 100,000 population. The influenza epidemics since 1937 have been minor, with maximum weekly excess rates of approximately 200 or less per 100,000 (fig. 6).

TABLE 6.—*Date of median day and number of weeks included in each epidemic of influenza in cities of nine geographic sections of the United States, 1935–42*

Median day and extent of epidemic	All cities	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
					Epidemic of 1935–36					
Median day [1]	Mar. 11	Feb. 12[2]	Mar. 4	Apr. 13	Mar. 18	Feb. 27	Mar. 11[2]	Mar. 27	None	Mar. 2
Number of weeks included	22	14	8	9	16	8	24	12	None	6
First and last week [3]	52–21	52–13	7–14	12–20	5–20	6–13	49–20	8–19	None	7–12
					Epidemic of 1936–37					
Median day [1]	Jan. 22	Feb. 1	Jan. 13	Jan. 9	Jan. 21	Feb. 4	Mar. 1	Feb. 15	Jan. 17	Feb. 3
Number of weeks included	11	12	7	13	9	16	15	8	11	9
First and last week [3]	52–9	51–9	53–6	50–9	53–8	49–11	5–19	3–10	51–8	1–9
					Epidemic of 1938–39					
Median day [1]	Mar. 5	Mar. 21	Feb. 11	Mar. 4	Mar. 11	None	Mar. 23	None	None	None
Number of weeks included	9	6	7	7	7	None	7	None	None	None
First and last week [3]	6–14	9–14	4–10	7–13	8–14	None	9–15	None	None	None
					Epidemic of 1939–40					
Median day [1]		None	None	None	Feb. 11	Feb. 5	Feb. 11	Feb. 11	None	None
Number of weeks included		None	None	None	8	5	4	8	None	None
First and last week [3]		None	None	None	3–10	4–8	5–8	4–11	None	None
					Epidemic of 1940–41					
Median day [1]	Jan. 22	Jan. 21	Feb. 1	Feb. 2	Jan. 19	Jan. 30	Jan. 19	Jan. 8	Jan. 8	Dec. 25
Number of weeks included	10	6	6	4	10	8	6	7	6	7
First and last week [3]	51–8	2–7	3–8	4–7	52–9	3–10	1–6	51–5	52–5	49–3

[1] The median day was determined as for a frequency distribution; the excess rates were considered as frequencies. Due to variability of the rates the probable error of the median day is large.

[2] The 1935–36 epidemic was bimodal in the New England and East South Central sections. In New England the median day of the first part of the epidemic was Jan. 7, of the second part Feb. 26; in the East South Central the median day of the first part of the epidemic was Dec. 28, of the second part Mar. 22.

[3] The first and last week of an epidemic are given in calendar weeks; if January 1 falls on Wednesday or earlier in the week that week is counted as the first of a specific year.

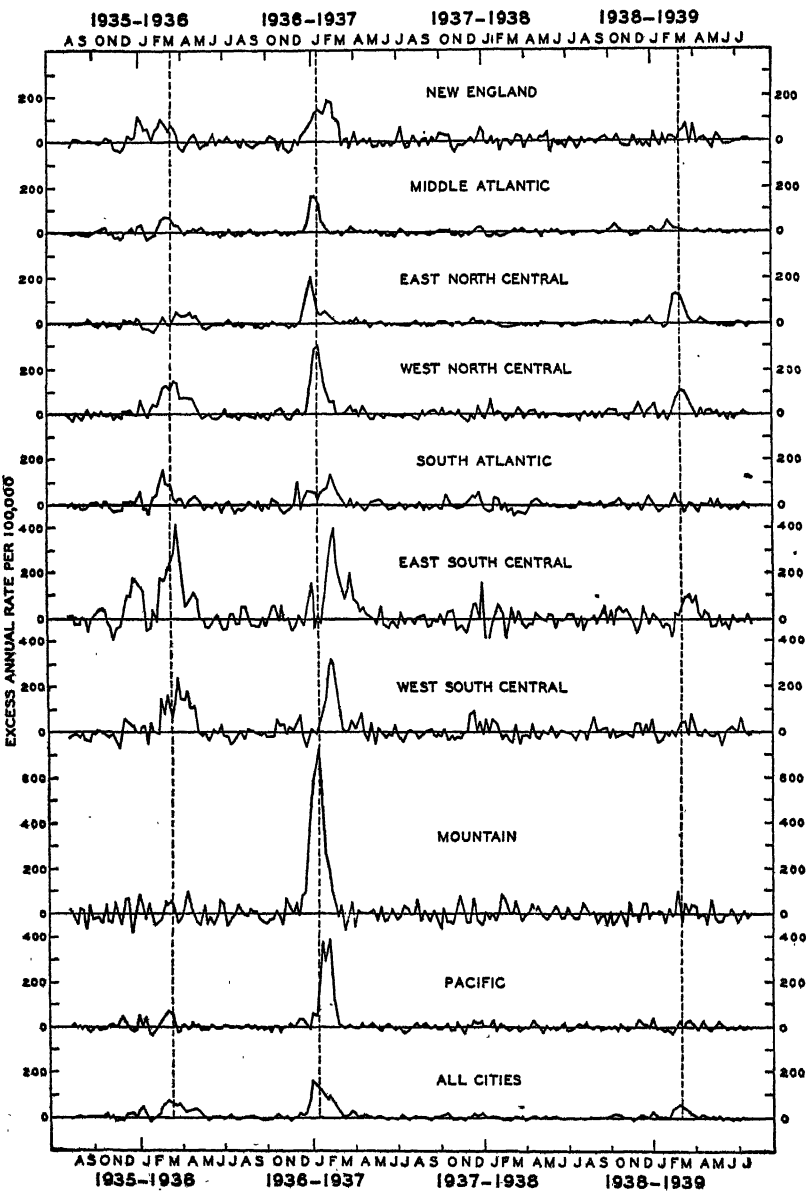
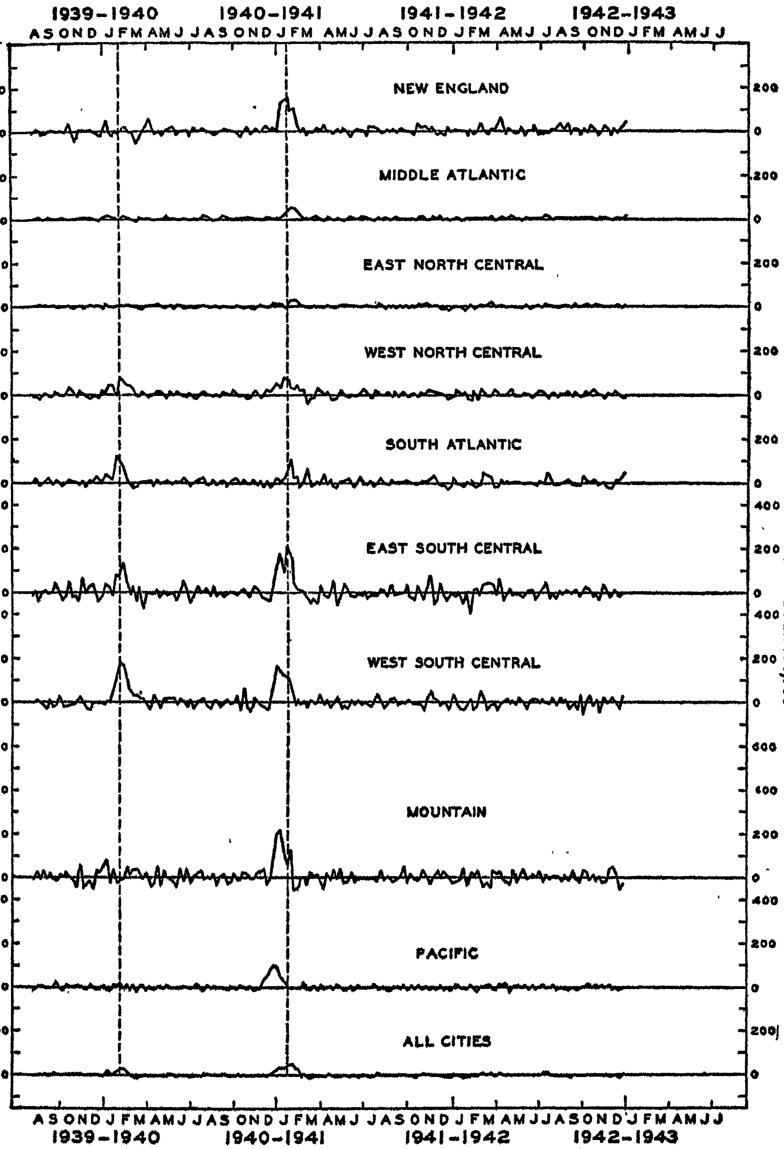


FIGURE 6.—Weekly excess mortality (annual basis) from influenza and pneumonia (See appendix for method of



in cities of nine geographic sections of the United States, August 1935 to July 1942.
computation of excess rates.)

The epidemic of 1935–36 (fig. 6) was long continued and not very explosive in any section. The outbreak started at approximately the same time in two sections, New England and the East South Central, where it was definitely bimodal; in both sections the first peak occurred at the end of December and the second in February or March. The West North Central and South Atlantic regions show slight epidemic excesses in January. The peak weeks of the second part of the epidemic extend in the several geographic sections from the latter part of February to the early part of April. The Mountain region showed no epidemic excess in this year and the Pacific a slight excess only.

The epidemic of 1936–37 extended over the entire country with the highest rates in the Mountain region. The epidemic began in the East North Central section and spread from there to the East, South, and West.

The epidemic of 1938–39 was small and limited to five geographic sections. It occurred first in the Middle Atlantic (with very small excesses) and in the East North Central regions and spread into the New England, West North Central, and East South Central sections.

The epidemic of 1939–40 was also very small and occurred in only four of the nine geographic sections. It began in the South Atlantic and spread later to the West North Central, East South Central, and West South Central regions.

The epidemic of 1940–41 was small but occurred to some extent in all geographic sections. It started on the Pacific Coast and spread East over both a northern and southern route (*7*).

The year 1942–43 thus far (April 1943) shows no epidemic excess in any of the sections.

SUMMARY

A record of weekly mortality from influenza and pneumonia in a group of about 90 cities in the United States was reported upon earlier for the years 1920–35; this record has been brought up to 1943. Since the summer of 1937, pneumonia mortality has declined markedly. An average of the rates for the last 5 years (1938–42) compared with the 5 preceding years (1933–37) shows a decline of approximately 40 percent (from a rate of 110 to 69 per 100,000). Annual rates for quarterly periods with epidemic excess deaths excluded show less of a decline for the third quarter (July to September) than for other quarters of the year. The decline has occurred in all geographic sections. However, mortality from influenza and pneumonia for all cities was higher in the third and fourth quarters of 1942 and the first quarter of 1943 than it was in the same quarter of the 3 preceding years; the excess over the same quarter of the preceding year was greater in the

fourth quarter of 1942 and the first quarter of 1943 than in the third quarter of 1942.

Epidemics of minor intensity occurred in five of the eight winters since August 1935. Three of these epidemics were practically Nation-wide, 1935–36, 1936–37, and 1940–41. The epidemics of the winters of 1938–39 and 1939–40 were confined to four or five of the nine geographic sections of the country. The year 1942–43 thus far shows no epidemic excess in any of the sections.

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Appendix

The method of computing a normal seasonal curve of influenza and pneumonia mortality which was used for the years 1920–35 has been described in detail in earlier reports (*2*, *3*). For the years 1920–29 the normal seasonal curve was based on median rates for each week for the 7-year period 1921–27; the 52 weekly medians were smoothed by a 5-week moving average and used for the whole 10-year period without adjustment for change in average annual level of the rates. For the years 1930–35 the normal seasonal curve was based on the mean of the rates for corresponding weeks in the 4 years 1930–33 with interpolated values

substituted for obviously epidemic rates. The 52 weekly values in these 4-year means of rates with epidemic items removed were smoothed by a 5-week moving average and used as a relative basis for seasonal expectancy. Adjustment for the change in level from year to year in the average annual influenza and pneumonia death rate was made by multiplying each of the 52 weeks of the normal seasonal curve by a constant; this constant was the ratio of the average of the 52 rates for a specific year (with epidemic items replaced by interpolated values) to the average of the 52 rates of the normal seasonal curve, the process being repeated for each of the nine geographic sections. The curve of normal seasonal expectancy adjusted to the level of the year in question was then subtracted from the actual rates to give weekly excess rates for each year. Although there was some downward trend in influenza and pneumonia rates from 1930 to 1935 this method gives a reasonable normal seasonal curve from which to obtain excess rates. The method is not refined but influenza epidemics are of such magnitude that small differences in normal seasonal expectancy are almost negligible in comparison.

Some change in the method of computing a normal seasonal curve of influenza and pneumonia was made necessary by the rapid decline in the rates which has taken place since 1937. If the 52 smoothed mean rates obtained from the 3-year period 1939–42 are multiplied by a constant ratio, as was done for the years 1930–35, a derived normal seasonal curve is obtained which gives a very poor fit to the rates for the period 1935–37. This is due at least in part to the fact that influenza-pneumonia mortality during this period declined at a slower rate during the third quarter (July–September), so that the seasonal curve of influenza and pneumonia mortality has a smaller amplitude in the year 1941–42 than it had in 1935–36.

To avoid this difficulty the level of the normal seasonal curve used since 1935 is adjusted quarterly instead of annually. The detailed computations were made as follows: The normal seasonal curve was based on the mean of the rates for corresponding weeks in the 3 years ended in August (31st week) of 1942, with interpolated values substituted for obviously epidemic rates. This period was chosen because of the small number of epidemic items and the similarity of the seasonal incidence in the 3 years. The 52 weekly values in these 3-year means of rates (with epidemic items replaced by interpolated values) were smoothed by a 5-week moving average and used as a relative basis for seasonal expectancy. Adjustment for change in level of the actual rates was made at quarterly intervals by the following procedure: The average of the actual rates (epidemic items replaced by interpolated values) for the 13 weeks of each quarter for each year was related to the average of the rates for the 13 weeks of the corresponding quarter of the normal seasonal curve to obtain a ratio of the actual to the expected rate for each quarter of each year. Between these quarterly ratios (centering in the middle of each quarter) straight line interpolations were made to get such a ratio for each week of each year. Then the rate in the normal seasonal curve for a given week was multiplied by the above ratio for the corresponding week to obtain a seasonal expectancy for each week of each year, this process being repeated for each of the nine geographic areas. The norm or expectancy for each week of each year for all sections combined was obtained by a weighted average of the nine sectional norms for that week, with the populations of the respective sections as the weights.

The method of deriving a normal seasonal curve of influenza and pneumonia as outlined above is admittedly rough. Moreover, the use of quarterly ratios results in a changing yearly norm which seems to be necessary for the years during which the decline was rapid. The seasonal norms as computed, however, serve as

a base from which to estimate the approximate magnitude of marked fluctuations such as occur in influenza epidemics.

Appendix tables A–J give the deviations from the seasonal expectancy for each section, together with the seasonal norms and other data necessary to derive the actual rates.

TABLE A.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

ALL 90 CITIES

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	36	−4	−7	+2	+1	−5	0	0	−6
33	35	−2	−7	−2	−1	+2	−6	−1	+1
34	33	−3	+1	−3	+2	+1	0	−2	+2
35	33	−2	+1	+2	+7	−1	−2	−3	+2
36	35	−5	−4	−6	−3	−2	−1	+2	−7
37	37	−6	−9	−12	−1	+3	+5	−4	+2
38	38	0	−8	−2	0	−1	+1	0	−5
39	40	+2	−9	+1	+5	+6	−1	+3	−1
40	41	0	−7	+5	+5	−1	+1	−3	+5
41	44	+2	−6	+12	+12	−3	+5	+1	+2
42	45	+5	+6	+12	+13	−1	−6	−7	+4
43	48	+15	+11	+5	+11	+6	+3	+4	+3
44	51	−2	−3	−0	+1	−1	−1	+4	−3
45	55	−3	+1	−5	−5	−4	−6	+4	−4
46	57	−18	−3	−3	−6	+5	0	+3	+2
47	60	−13	−10	−15	−11	+2	−2	+6	−2
48	63	−16	−4	−5	+6	−3	+1	+2	−5
49	66	+13	+4	0	+6	+2	0	+2	+2
50	69	+12	+17	+19	−1	0	+7	−5	+2
51	75	+17	+10	+11	+1	0	+7	−3	−6
52	81	+5	+18	+21	+9	−5	+15	−10	+9
53	--------	--------	+71	--------	--------	--------	--------	−9	--------
1	86	+36	+157	+15	+22	+4	+30	+4	--------
2	91	+41	+138	−4	+8	+18	+34	+2	--------
3	95	+12	+128	−5	−6	+6	+32	−8	--------
4	96	−19	+108	+5	−6	+9	+48	−10	--------
5	96	−13	+83	+1	+2	+18	+53	−4	--------
6	97	−2	+94	−3	+8	+27	+33	−4	--------
7	97	+13	+77	−12	+26	+28	+25	−6	--------
8	96	+55	+53	−11	+44	+16	+4	−6	--------
9	93	+71	+31	−14	+53	+3	+5	+6	--------
10	91	+65	+5	−6	+50	−2	−1	+9	--------
11	88	+53	+7	+2	+38	−14	−7	0	--------
12	84	+47	+11	0	+28	−2	+2	+13	--------
13	81	+59	+25	+5	+15	−4	+3	−2	--------
14	79	+39	+10	−8	+8	0	+2	−2	--------
15	74	+23	+13	−2	−3	+1	−2	+9	--------
16	69	+27	+10	+5	+11	−3	+7	−3	--------
17	64	+33	+6	+4	+4	+2	−3	+3	--------
18	60	+34	+4	+1	+1	−3	−6	0	--------
19	56	+25	+3	−1	+7	−1	−5	0	--------
20	52	+8	−2	+6	−5	+7	−1	−3	--------
21	49	+2	+6	+4	+8	+4	−2	−1	--------
22	46	−17	+2	0	−4	−3	+2	+2	--------
23	44	−4	−4	0	−5	0	+3	−6	--------
24	41	−8	−9	+1	−9	+3	−4	−4	--------
25	39	−4	−6	−7	−3	+2	−3	+1	--------
26	38	−4	−9	−1	−5	−3	+5	−2	--------
27	37	−8	−7	−3	−6	−8	+5	+1	--------
28	37	−1	+7	−2	+1	−4	−1	+6	--------
29	38	+7	−7	−9	−2	−1	−4	+8	--------
30	37	−7	−10	−6	−6	+2	−1	−1	--------
31	37	−10	−3	−1	−4	+9	+11	0	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
3d quarter (27th–39th week)	1.388	1.415	1.382	1.232	1.007	0.998	0.971	1.026
4th quarter (40th–52d week)	1.694	1.734	1.644	1.338	1.071	.967	.912	1.132
1st quarter (1st–13th week)	1.787	1.788	1.408	1.321	1.142	.992	.885	--------
2d quarter (14th–26th week)	2.088	1.758	1.361	1.193	1.117	.952	.909	--------

TABLE B.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

NEW ENGLAND

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	38	−18	−23	+25	+20	−21	−5	−10	+10
33	33	+12	+12	+10	−3	+5	−5	0	+23
34	31	+9	−10	−11	+5	+5	−10	+4	+5
35	33	+8	−12	+9	+2	−15	−8	−3	+26
36	37	−1	−20	+10	−10	−14	+1	+8	−14
37	41	−2	−14	−15	+6	0	+7	−13	+3
38	45	−2	−13	+15	+16	+5	+5	+11	−1
39	48	+4	−3	+8	+18	+2	0	+3	−17
40	48	−4	−3	+35	+11	−2	−2	+3	+7
41	53	−4	+26	+35	+3	0	−8	−4	−11
42	58	+1	+18	+33	+10	−10	−22	−26	+19
43	61	+23	+19	+30	+28	+42	−10	+24	+7
44	60	+11	−36	−17	−7	0	+16	+12	−18
45	75	+5	+12	−43	−20	−45	−16	+19	−5
46	75	−29	−24	−15	−21	+3	0	−1	+11
47	75	−35	−40	−17	−20	+7	+10	+16	+5
48	80	−40	−36	−11	+30	+1	−4	−1	−26
49	81	−16	+15	+8	−22	+2	+6	−25	+5
50	84	+32	−18	+19	0	+5	+24	−15	−9
51	87	+16	+27	−2	−27	−6	+7	−23	+9
52	96	+22	+45	+33	−7	−15	+14	+15	+29
53	--------	--------	+71	--------	--------	--------	--------	−6	--------
1	99	+117	+92	+59	−28	−19	−6	+4	--------
2	104	+94	+127	−3	+38	+49	+126	+2	--------
3	104	+50	+136	−11	+4	0	+144	−6	--------
4	107	+63	+134	+22	−22	−19	+155	−1	--------
5	105	+10	+125	−7	+32	+6	+87	−19	--------
6	107	+48	+190	+5	−8	−9	+97	+5	--------
7	112	+69	+178	−44	+27	+19	+39	−14	--------
8	111	+100	+108	+8	+20	+14	−5	−5	--------
9	109	+84	+87	+4	+8	−5	+15	+33	--------
10	107	+53	−11	−14	+47	−2	−21	−7	--------
11	105	+75	+13	−1	+57	−61	−4	−19	--------
12	100	+57	+23	+32	+79	−27	−4	+2	--------
13	102	+89	−30	+22	−10	−2	+10	−4	--------
14	101	−26	+34	−30	+82	+20	−1	+29	--------
15	97	−37	−12	−4	−12	+56	+25	+62	--------
16	90	0	−1	+26	+12	+7	−1	−18	--------
17	85	+22	+8	+6	+17	−10	−12	−1	--------
18	78	+36	0	−3	+3	−4	−13	−4	--------
19	76	+19	+13	+25	−12	−17	+9	−8	--------
20	73	−29	−21	+21	−31	+8	−13	−8	--------
21	66	−13	−14	+36	+36	+10	+7	+17	--------
22	62	−12	+5	−49	+18	+21	+3	−27	--------
23	60	+12	−18	+10	−11	−19	−31	−13	--------
24	54	+37	−4	−9	−12	0	−6	−9	--------
25	48	−13	−9	−11	+13	+1	+10	+20	--------
26	48	+13	−10	−13	−9	+9	+5	−13	--------
27	47	+8	+1	−16	0	−20	+1	−19	--------
28	45	+25	+68	+11	+3	+21	−25	−14	--------
29	44	+12	+1	0	+7	−3	+18	−15	--------
30	42	+2	−19	−30	+10	+5	+9	0	--------
31	41	+11	−19	−19	−7	+11	+5	−4	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
3d quarter (27th–39th week)	1.253	1.396	1.616	1.326	1.065	1.079	0.931	1.128
4th quarter (40th–52d week)	1.388	1.566	1.145	1.160	1.038	1.017	.916	1.377
1st quarter (1st–13th week)	1.609	1.643	1.535	1.357	1.154	.887	.949	--------
2d quarter (14th–26th week)	1.574	1.502	1.481	1.348	1.151	.831	1.132	--------

TABLE C.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

MIDDLE ATLANTIC

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	31	+4	−5	−2	−1	−2	+4	−3	−4
33	30	−4	−7	−5	0	0	−9	+4	−2
34	29	−2	+1	0	−1	+5	−4	−2	+2
35	30	−3	+7	−1	+2	−2	−2	−7	−5
36	31	−7	−3	−13	−6	−6	+6	+6	−4
37	32	−8	−8	−14	−4	+4	+5	−6	−2
38	34	−9	−9	−5	+1	+1	+6	0	−1
39	35	+2	−2	−2	+5	+3	−1	−1	+2
40	35	+6	−6	+10	+9	0	−1	−2	+4
41	35	+13	−1	+12	+19	+4	+2	+2	−4
42	38	+15	+1	+13	+36	−4	−3	−7	−2
43	40	+28	+8	+10	+16	−4	+1	+2	+3
44	42	−1	+1	−6	+5	+3	+4	+7	−7
45	46	−2	−6	−7	−4	−1	−2	+4	+6
46	48	−21	+1	−5	−5	+4	+4	−5	+2
47	50	−14	−6	−21	−18	+5	−6	−1	0
48	52	−23	+1	0	−9	+6	−1	−5	−6
49	54	−1	−5	−10	−8	+3	−4	+9	−1
50	55	+2	+2	0	−2	−3	+7	−3	+2
51	59	+24	+3	+18	−1	−5	−2	+4	+5
52	64	−4	0	+18	+3	−11	−13	−3	+5
53	--------	--------	+44	--------	--------	--------	--------	−4	--------
1	68	+32	+163	+22	+16	+7	+3	0	--------
2	73	+42	+158	0	+12	+12	+7	+4	--------
3	78	+10	+138	−11	+3	+8	+14	−14	--------
4	80	−31	+62	−15	+10	+4	+40	−1	--------
5	81	−15	+23	−8	+19	−2	+56	+1	--------
6	82	−6	+4	−23	+51	−2	+53	+2	--------
7	82	+21	+3	−15	+28	+12	+35	−3	--------
8	82	+56	−4	−9	+14	+2	+16	+1	--------
9	79	+69	+12	−6	+15	−1	0	+1	--------
10	78	+72	−13	−2	+13	−9	+2	+7	--------
11	75	+59	+2	+17	+6	−15	−5	−4	--------
12	73	+34	+12	+5	+2	+5	+11	+13	--------
13	70	+38	+27	+15	+2	−5	+6	−11	--------
14	69	+24	+16	+8	−1	0	−3	0	--------
15	63	−3	+3	+3	+7	+2	−9	+6	--------
16	60	+7	+10	−2	+1	−4	+14	−1	--------
17	56	+7	+3	+3	−4	−3	+3	−1	--------
18	53	+19	+2	+6	0	−5	−7	+5	--------
19	48	+17	+5	−13	+11	+1	−2	−1	--------
20	45	+25	+4	+8	−1	+15	−4	−1	--------
21	43	+16	+11	+5	−1	+2	−9	−7	--------
22	40	−10	−10	+8	+7	−2	+5	+3	--------
23	37	−1	+1	+3	−5	+3	+8	−6	--------
24	36	−5	−12	+9	−5	−4	+1	−7	--------
25	34	−3	−6	−9	−6	+5	−7	−3	--------
26	33	−19	−18	−8	0	−5	+9	−4	--------
27	32	−10	−6	−5	−7	−8	+7	+1	--------
28	32	−12	+20	0	−4	0	+6	+12	--------
29	32	+15	+4	−8	−4	−9	−7	+13	--------
30	32	−7	−11	−2	−8	−1	−2	−5	--------
31	31	−12	0	+2	0	+10	+10	−2	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

3d quarter (27th–39th week)	1.489	1.449	1.477	1.214	.930	1.022	1.041	1.088
4th quarter (40th–52d week)	1.891	1.780	1.701	1.268	1.051	.935	.975	1.197
1st quarter (1st–13th week)	1.910	2.075	1.485	1.376	1.159	1.024	.904	--------
2d quarter (14th–26th week)	2.186	1.910	1.518	1.237	1.140	1.021	.866	--------

TABLE D.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

EAST NORTH CENTRAL

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	26	−10	+3	+10	−7	−4	−7	+5	−4
33	26	−4	−13	+8	−2	−2	−2	−8	−2
34	23	+1	+1	−6	+3	+7	−1	−3	+3
35	24	−2	−2	+3	+8	+1	+3	−4	+1
36	26	−4	−1	−8	+4	+11	−6	−8	−2
37	28	+5	−7	−11	−4	−3	+7	−1	+8
38	29	+19	−10	−5	−4	+5	−1	−2	−5
39	32	+3	−18	+8	+12	+1	−3	+6	+8
40	34	−13	−8	+12	+2	−5	−4	−8	+5
41	37	−17	−7	+12	+11	+4	+10	+6	+7
42	38	0	+8	+6	−1	−2	−4	−2	−5
43	42	+9	+1	+1	−1	+5	−7	+11	−1
44	42	−6	−7	−10	−2	−12	−2	+5	+2
45	45	−5	+3	+9	+2	+3	−4	+13	−4
46	46	−5	−4	+4	−3	+6	−16	+6	−1
47	50	−6	−18	−8	−8	−6	+1	−3	−1
48	52	−23	+1	−2	+12	−3	+8	+2	0
49	56	+22	−7	+4	+4	+4	+2	+1	+3
50	60	+8	+3	+27	−5	+4	−1	−10	+2
51	65	+13	+19	+7	+4	+2	+2	−7	−13
52	71	+2	+60	+7	+19	+2	+14	−15	+10
53	----------	----------	+152	----------	----------	----------	----------	−4	----------
1	74	+23	+212	+4	+31	−7	+8	+4	----------
2	77	+20	+126	−2	−2	+18	+11	+1	----------
3	79	−14	+56	+14	0	−3	−8	−6	----------
4	81	−18	+41	+1	−8	+2	+16	−22	----------
5	80	−24	+51	+2	−17	+5	+32	−5	----------
6	81	−37	+52	−8	−7	+11	+26	+4	----------
7	82	−20	+34	−15	+63	+5	+24	−8	----------
8	81	+7	+22	−16	+128	+3	0	−4	----------
9	77	+25	+12	−17	+133	−2	+2	+4	----------
10	75	−5	0	−11	+130	−4	−2	+2	----------
11	71	−6	+9	−5	+90	−7	−5	+3	----------
12	68	+17	−3	−4	+52	−13	+4	+19	----------
13	65	+53	+17	+6	+19	−9	−6	+3	----------
14	64	+38	+5	−6	−1	+2	−4	+3	----------
15	60	+32	+27	−2	+6	+2	−7	+3	----------
16	58	+34	+4	−7	+22	+2	+7	+1	----------
17	53	+51	+5	−4	+16	+6	−6	+2	----------
18	50	+30	+18	−9	+4	+1	−3	0	----------
19	46	+35	−14	+14	+3	−6	−7	−1	----------
20	44	+5	+2	+3	−5	+5	−1	−5	----------
21	42	−11	+6	+1	+1	+6	+5	−6	----------
22	41	−27	+14	0	−11	−9	+5	+7	----------
23	38	−14	−5	+4	−6	+5	+3	−8	----------
24	36	−7	−9	+1	−12	+11	0	−1	----------
25	33	−1	−2	−7	−10	−6	−4	−1	----------
26	31	+2	−6	+5	−9	−4	0	+2	----------
27	29	−3	−4	+6	−6	0	+4	−4	----------
28	28	+9	−9	0	+1	−6	+2	+3	----------
29	29	+15	−12	−9	−7	−2	−4	+6	----------
30	29	−3	−9	−6	−12	+3	−3	−2	----------
31	27	−9	−10	−4	−3	+6	+21	−2	----------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
3d quarter (27th–39th week)	1.766	1.605	1.341	1.294	1.004	1.007	0.920	0.934
4th quarter (40th–52d week)	1.687	1.678	1.730	1.393	1.089	1.010	.846	1.007
1st quarter (1st–13th week)	1.845	1.753	1.288	1.279	1.127	1.015	.817	----------
2d quarter (14th–26th week)	2.390	1.890	1.245	1.166	1.184	.910	.836	----------

TABLE E.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

WEST NORTH CENTRAL

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	48	−7	−27	−10	+6	−9	+14	−8	−16
33	43	−26	+3	−19	+6	−10	+4	−4	+1
34	40	+7	−1	−15	−8	−19	−4	+10	+3
35	39	−5	−11	+18	+8	−1	−1	−10	+11
36	40	−14	−14	−4	−14	+2	−8	+10	−12
37	43	−7	−16	+3	+7	−5	+9	−8	+11
38	45	+25	+5	+21	−5	−7	+6	+6	0
39	46	+1	−11	+19	+5	+10	+2	0	−11
40	48	+11	−9	+1	+20	−5	+19	−13	+16
41	50	+3	−24	+27	+24	−7	−7	−7	+2
42	52	+10	+4	−1	+21	+12	−4	−6	+18
43	54	−5	+8	+8	−4	+26	−4	−13	+21
44	63	−7	+20	+5	+3	+15	−21	+5	−2
45	67	+3	+29	−2	−19	−11	−11	+1	−13
46	69	−22	+9	+18	−23	+16	+18	+18	−18
47	70	+3	−28	−10	+2	+2	−5	+11	+4
48	75	−18	−16	−27	+11	−9	−19	+11	−4
49	75	+12	+14	−36	+56	−16	−5	+5	+13
50	78	+15	+24	−2	+15	−8	+18	−1	+4
51	85	+17	+16	−20	−17	−7	+14	−4	−16
52	95	+4	−2	+40	+17	−16	+22	−19	−17
53	--------	--------	+22	--------	--------	--------	--------	−10	--------
1	101	+10	+208	−5	+33	+20	+48	−8	--------
2	106	+65	+291	−19	+49	+6	+25	+17	--------
3	109	+28	+310	+3	−14	+41	+82	+3	--------
4	108	−15	+240	+68	+1	+39	+62	+10	--------
5	107	+32	+137	+1	+22	−15	+32	−26	--------
6	105	+46	+86	+13	−26	+74	+21	−28	--------
7	105	+37	+57	+4	0	+63	+42	+9	--------
8	103	+73	+59	−29	+43	+44	+18	−23	--------
9	100	+121	+3	−23	+92	+44	+21	+20	--------
10	95	+129	+2	+4	+109	+20	−30	+3	--------
11	97	+104	+16	−17	+100	−12	−16	−9	--------
12	92	+148	+15	+32	+75	−10	−13	+3	--------
13	91	+134	+37	+15	+40	+9	+26	+21	--------
14	91	+76	+15	−21	+22	−13	+14	+1	--------
15	90	+75	+14	+2	−9	−12	+3	−6	--------
16	83	+76	−5	+20	+29	+2	+10	−4	--------
17	77	+69	+40	+21	0	+13	−17	+9	--------
18	72	+73	+11	−4	+10	+17	−19	+15	--------
19	67	+38	−22	−13	+21	+4	−13	−4	--------
20	61	+18	−24	+6	+4	−16	+15	−5	--------
21	57	−7	+4	−9	+14	+17	−1	0	--------
22	53	−5	−5	−6	−13	−7	−5	+5	--------
23	49	+2	−12	−4	+6	+9	0	+2	--------
24	46	−14	−5	−6	−25	−2	−2	−13	--------
25	47	−25	−6	−9	+8	−9	−5	−6	--------
26	46	−7	−7	−4	−21	−13	+8	0	--------
27	44	−6	−13	−7	−6	+4	+19	+9	--------
28	47	+23	0	−12	0	−15	0	+10	--------
29	50	−11	−17	−5	+12	−20	−17	−22	--------
30	48	−12	−4	−1	+7	0	+12	+6	--------
31	47	−4	+2	−17	−5	+13	+5	+11	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

3d quarter (27th–39th week)	1.061	1.099	1.178	1.006	0.872	1.102	1.036	1.001
4th quarter (40th–52d week)	1.493	1.520	1.275	1.458	.988	1.098	.859	1.106
1st quarter (1st–13th week)	1.576	1.447	1.330	.946	1.129	1.042	.846	--------
2d quarter (14th–26th week)	1.801	1.341	1.080	1.171	1.069	.980	.881	--------

TABLE F.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

SOUTH ATLANTIC

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	49	−4	−12	−2	0	+4	−10	+16	−11
33	48	+9	−18	−13	+5	+18	−10	+3	−4
34	45	−16	−13	+15	+13	−18	+9	−10	+3
35	46	−4	+13	−19	−2	−3	−8	+6	+9
36	44	−10	+2	+6	+3	+4	−2	−3	−11
37	48	−11	−12	−16	+19	+21	+5	+2	−11
38	50	+1	+12	−7	−14	−10	−20	−6	−10
39	53	+16	−20	+1	−13	+12	+6	+2	−14
40	53	+10	+3	−12	−2	−7	+12	+6	+24
41	60	+20	−12	−7	+7	−16	+19	−3	+6
42	62	−4	+28	+51	+10	+2	−9	−5	+1
43	65	+16	+22	+10	+28	+13	+13	−8	+8
44	69	+20	+7	−1	+6	+7	−10	+1	−9
45	76	−13	−25	−13	+3	+2	−8	+11	−5
46	80	−33	−33	−14	−19	−15	+2	+5	0
47	84	−24	−18	−9	−6	+9	−9	+21	−28
48	87	−17	−13	+4	−3	−17	+7	+31	−31
49	92	+20	+14	+20	+12	+12	−24	−3	−12
50	95	+15	+104	+38	−31	0	+4	−13	+8
51	106	+22	−19	+32	+5	+28	−25	−12	+10
52	117	+11	+35	+57	+42	+9	−5	−32	+45
53			+65					−17	--------
1	129	+26	+57	+11	+19	+9	+15	+20	--------
2	138	+64	+57	−24	+5	+33	+2	−9	--------
3	147	−8	+23	−25	−32	+24	+20	−8	--------
4	149	−11	+57	−17	−18	+7	+57	−25	--------
5	151	−37	+71	+36	−5	+126	+102	+5	--------
6	149	+37	+80	+27	−8	+89	+15	−3	--------
7	149	+38	+142	−22	+21	+62	+25	−12	--------
8	148	+100	+105	+5	+55	+19	−24	−18	--------
9	145	+158	+58	−29	+21	−13	+9	−11	--------
10	144	+93	+43	−14	+10	−25	+65	+42	--------
11	141	+80	+14	−40	−35	−21	−24	+29	--------
12	136	+36	−5	−27	+10	+1	−8	+25	--------
13	132	+13	+36	−27	+12	+5	+7	−16	--------
14	121	+31	−8	−41	−2	+4	−9	−20	--------
15	112	+27	+17	−9	−35	+4	+43	+12	--------
16	99	−8	−1	+15	+9	−23	−7	−11	--------
17	90	+20	−7	+17	+5	+7	+12	+6	--------
18	77	+37	−21	+24	−1	−9	−20	−3	--------
19	72	+40	+16	+13	+34	0	−24	+5	--------
20	64	+22	+18	+4	−13	+7	+4	+4	--------
21	61	+3	+20	+9	+29	−3	+6	+3	--------
22	56	−21	+22	−6	−11	−9	+12	−6	--------
23	53	−4	+6	−1	+5	+4	+9	−4	--------
24	51	−10	−11	−13	−15	−3	−23	−5	--------
25	49	+10	−21	−10	−15	+20	−6	−2	--------
26	46	+2	−15	+3	−6	+8	+18	−7	--------
27	49	−32	−9	−2	−13	−15	−3	+9	--------
28	48	+5	+12	−8	+4	−10	−7	+4	--------
29	49	+18	−5	−17	+9	+13	+2	+41	--------
30	50	−10	−18	−17	−11	+15	−18	+8	--------
31	52	−31	+3	+13	−17	+23	+4	−10	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
3d quarter (27th–39th week)	1.172	1.364	1.479	1.209	1.118	0.929	0.882	1.030
4th quarter (40th–52d week)	1.648	1.896	1.963	1.362	1.183	.870	.869	1.210
1st quarter (1st–13th week)	1.679	1.679	1.306	1.138	1.065	1.044	.883	--------
2d quarter (14th–26th week)	2.097	1.665	1.299	1.068	1.050	1.056	.818	--------

TABLE G.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

EAST SOUTH CENTRAL

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	46	+7	−22	−21	−44	−13	+18	+15	−24
33	48	+16	+45	+7	−7	+5	−15	+7	+3
34	40	−26	+53	+13	−7	−39	+32	−10	−7
35	45	−20	+1	+20	+8	0	−11	+41	+12
36	45	+10	−27	−35	−27	+6	+3	−9	0
37	50	−5	−28	−30	+18	0	−14	0	+7
38	51	−50	−30	−13	+48	+4	−8	−1	+17
39	49	−3	+6	−12	−16	+38	+7	+1	−16
40	48	+15	−34	+20	+30	+6	+2	+32	+3
41	55	+43	+22	−18	−27	−35	−10	−17	+19
42	55	+46	+54	+33	+37	−23	+11	−29	+13
43	56	+41	+45	+36	+61	+47	+17	+20	−17
44	68	−15	−14	+43	+28	−20	+8	+4	−12
45	91	−31	+61	−42	+43	−16	−23	−28	−36
46	92	−93	−2	−28	+6	−39	+35	+8	+34
47	102	−40	+3	−28	−18	+74	+20	+74	+12
48	113	−30	−54	−64	−64	+2	−10	−53	−17
49	114	+45	−35	+9	−29	+33	−18	−17	+11
50	103	+106	+17	+61	+57	+47	−29	+43	−1
51	117	+107	+3	+69	+9	−8	−36	−6	−15
52	130	+188	−31	−2	−12	−44	−10	−30	+6
53	....	....	+65	....	....	....	....	−4	....
1	144	+159	+159	+149	+19	−9	+127	−8	....
2	157	+136	−39	−104	+1	+40	+176	−19	....
3	175	+118	+13	−81	−9	+19	+89	−4	....
4	175	−46	−19	−20	−42	−20	+205	−46	....
5	178	−39	+97	+25	−20	+80	+163	+5	....
6	179	+44	+190	+67	−27	+73	+30	−96	....
7	182	−10	+319	+33	−82	+134	+13	+9	....
8	181	+182	+409	−93	+30	+52	+8	+16	....
9	178	+163	+236	−34	+7	+3	−1	−12	....
10	171	+211	+177	+51	+48	+25	−31	+36	....
11	153	+245	+95	−21	+94	−25	−45	+38	....
12	144	+286	+140	+39	+111	+18	−29	+40	....
13	132	+419	+202	−16	+65	−72	−49	+32	....
14	121	+292	+92	−38	+103	0	+36	−12	....
15	108	+116	+78	−21	+26	−5	−8	+58	....
16	107	+64	+36	−18	+1	−11	−19	−31	....
17	93	+93	+52	+33	+36	+12	−6	−13	....
18	81	+120	+19	+23	+17	−18	+55	+21	....
19	78	+88	+9	+2	−32	+5	−54	−6	....
20	73	+2	−3	−4	−32	−8	−11	−8	....
21	63	−7	−21	+13	+24	−3	+35	−7	....
22	65	−40	+52	+17	−30	+3	+15	−21	....
23	67	−34	−27	−39	−18	−31	−12	+6	....
24	61	−12	−33	−6	−44	+15	−12	+16	....
25	56	+20	−22	−7	+13	+54	−8	+7	....
26	54	−13	−16	−5	−4	+5	−12	−27	....
27	55	−45	−40	+19	−11	−40	+6	−5	....
28	49	−44	+31	+20	−4	0	−26	+12	....
29	51	+16	−22	−2	−12	+24	−8	+45	....
30	53	+22	−2	−32	+19	+4	−10	−18	....
31	53	−22	+1	+7	−20	+4	−4	−7	....

Quarterly factors for adjustment of smoothed mean to obtain annual norms

3d quarter (27th–39th week)	0.926	1.439	1.106	1.249	0.974	0.986	0.888	1.056
4th quarter (40th–52d week)	1.746	1.620	1.600	1.574	1.195	.807	.856	1.050
1st quarter (1st–13th week)	1.452	1.524	1.369	1.095	1.175	.948	.832	....
2d quarter (14th–26th week)	2.183	1.867	1.138	1.075	1.180	.922	.844	....

TABLE H.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

WEST SOUTH CENTRAL

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	79	−21	+3	−4	−9	−1	−11	−16	−9
33	78	−15	−30	−31	−31	+13	−28	−19	+23
34	71	−5	+16	−13	+15	+8	+7	+4	+2
35	72	−21	+12	0	+69	−17	+9	+15	+11
36	73	−4	+2	+8	+14	−29	−20	+15	−25
37	71	−30	−5	+8	+7	+9	+3	−8	−2
38	74	−35	−11	−21	+17	−22	+13	+5	−33
39	78	−6	0	−7	+15	−13	−12	+1	+28
40	75	−5	−26	−23	−23	+31	−4	+13	−45
41	79	+11	−25	+14	+8	−21	+33	−6	+5
42	81	−6	−20	−30	−25	−12	−40	−4	+26
43	78	−13	+61	−16	−21	−12	+65	−7	−12
44	86	−24	+27	−32	−16	−2	−21	−7	+8
45	99	−8	+29	−22	−7	+7	−41	−37	−52
46	102	−36	−4	−25	−14	+29	+17	+20	+23
47	109	−67	+19	+1	−24	−5	+1	+48	+2
48	117	+15	+13	+9	+37	−29	−10	+21	+13
49	123	+54	+46	+82	+44	−34	−19	+14	+22
50	130	+42	+76	+89	−21	−2	−28	−12	−7
51	143	+34	−22	+10	+27	0	+31	+2	−26
52	154	+4	−75	+44	+1	+4	+79	−6	+26
53	--------	--------	−16	--------	--------	--------	--------	−36	--------
1	163	−2	+10	−13	+54	−5	+162	+32	--------
2	164	+24	−11	+62	−24	+8	+140	−8	--------
3	165	+26	+33	0	−49	0	+117	−25	--------
4	164	−53	+96	+52	−29	+52	+109	−33	--------
5	163	+42	+142	+47	−1	+107	+49	−3	--------
6	163	+4	+289	+1	−14	+183	−11	+13	--------
7	168	−11	+328	−27	+5	+164	+11	−35	--------
8	168	+137	+230	−9	−19	+98	−10	−18	--------
9	165	+79	+138	−32	+10	+50	+5	+48	--------
10	162	+169	+18	−45	+37	+24	−29	+26	--------
11	158	+59	+1	+30	+46	+27	+11	−35	--------
12	145	+126	+14	−53	−8	+17	−3	−13	--------
13	131	+235	+45	−16	+89	+17	+16	−8	--------
14	123	+147	+17	−17	+23	−10	+39	−37	--------
15	112	+141	+53	−27	−16	−27	−8	−14	--------
16	102	+183	+85	+33	−17	+35	+10	0	--------
17	100	+105	−9	−17	+11	−10	−27	+13	--------
18	97	+120	−35	−25	+3	−25	0	+1	--------
19	92	+8	+40	−5	−14	+21	+17	+10	--------
20	89	−17	−49	+7	−11	+14	−19	−11	--------
21	83	+4	+20	−7	+2	+18	−9	+25	--------
22	77	−33	−5	+29	−55	+14	−27	+3	--------
23	76	−12	−25	−16	−15	−14	+10	−34	--------
24	70	+14	−12	−8	+8	+9	0	+11	--------
25	70	−13	−11	+6	+24	−2	+9	+14	--------
26	70	+30	+33	−5	+8	−20	−5	+12	--------
27	69	−19	−23	−5	+3	+4	+2	+1	--------
28	70	−18	−43	−7	+59	−26	−5	+19	--------
29	77	−53	−25	−36	+8	+3	−18	+2	--------
30	77	−41	+4	−16	−14	+7	+8	−2	--------
31	78	−21	+7	+4	−3	+20	+28	+17	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
3d quarter (27th–39th week)	1.169	1.261	1.053	1.455	1.121	0.906	1.010	0.976
4th quarter (40th–52d week)	1.486	1.735	1.573	1.355	1.074	.927	.985	.842
1st quarter (1st–13th week)	1.661	1.563	1.414	1.449	1.256	.943	.803	--------
2d quarter (14th–26th week)	2.188	1.713	1.252	1.152	1.135	.931	.849	--------

TABLE I.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

MOUNTAIN

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	54	+23	+22	−2	+47	−14	+3	+33	+1
33	53	−12	−9	+65	+16	+29	−12	−7	−5
34	55	−41	−20	−29	+6	−5	+26	−1	−14
35	57	+24	+19	+11	+11	+34	−35	−11	−2
36	57	+15	+2	−13	−38	−6	+6	−18	−26
37	61	−68	+13	−35	−18	+23	+17	−5	+31
38	66	+35	−30	+9	−16	−7	−31	−2	−11
39	74	−20	−41	−10	−50	−14	−22	+56	−18
40	78	−18	−48	−65	+3	+15	+18	−29	+33
41	87	−15	−28	+33	−40	+3	−10	+13	+25
42	90	−38	−25	−37	−28	+22	−7	−6	−11
43	92	+38	+13	−30	+11	−5	+22	−8	+11
44	99	−37	−6	−37	−30	−18	+13	−5	−20
45	98	−39	−50	+14	−56	−51	−5	+28	+3
46	101	+59	+65	+80	+50	+63	−2	−7	−24
47	107	−15	+20	+9	−12	−45	+25	−28	−22
48	107	−44	+2	−45	+2	−30	+28	−3	+46
49	110	+60	+47	−45	−31	−12	+35	+27	+48
50	119	+65	−18	+74	+46	−57	−29	−12	+15
51	122	−84	+85	−20	+37	+35	−6	+26	−61
52	123	−3	+92	−42	−17	+23	+102	+10	−29
53			+308					−8	--------
1	128	+90	+575	−48	+11	+53	+195	−23	--------
2	133	+51	+685	+7	0	+85	+218	−15	--------
3	126	−19	+735	−21	+13	−33	+113	−17	--------
4	122	+43	+454	−2	+6	+42	+56	+47	--------
5	116	−10	+261	−29	−37	−27	+130	−39	--------
6	119	−55	+203	+2	+19	−10	−58	+23	--------
7	111	−35	+106	+88	−12	−2	−47	+6	--------
8	110	−31	+43	+66	+1	+50	−12	+28	--------
9	112	+59	−17	−4	+100	+8	−5	+7	--------
10	112	+43	+36	+5	−38	+35	−36	−44	--------
11	106	+56	−79	+59	+41	+30	+20	−25	--------
12	102	−22	+4	+15	+7	+17	+8	−41	--------
13	95	−41	+51	−30	+37	−14	+7	+24	--------
14	86	−22	−60	−5	+36	+31	−8	+18	--------
15	83	+52	+13	0	−16	−46	−54	+31	--------
16	76	+101	0	+45	−4	−28	+18	−8	--------
17	76	+25	+2	+13	−10	+55	−13	−18	--------
18	79	−7	−2	+33	−46	−46	+33	−30	--------
19	78	−45	+11	−6	+57	+31	−5	+40	--------
20	74	−46	+9	−24	+7	−5	+40	−22	--------
21	71	+39	−30	−16	−30	−10	−24	+7	--------
22	65	−49	+28	−8	−29	−19	−20	+39	--------
23	60	−11	−32	+33	−5	−46	+25	−1	--------
24	61	−53	−18	+16	−6	+42	−18	+6	--------
25	58	−2	+20	−18	+24	−19	−7	+11	--------
26	57	+61	+12	−22	+1	+39	+1	+6	--------
27	54	+43	−26	+26	−36	−31	−5	+26	--------
28	55	−58	−2	−6	−11	+9	−6	−22	--------
29	49	−29	+31	−21	+13	+24	−2	+10	--------
30	51	−22	+27	−22	−21	+30	−4	−7	--------
31	53	+38	−1	+12	+2	−13	−14	0	--------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

3d quarter (27th–30th week)	1.188	1.278	1.459	1.105	1.004	0,997	0.900	0.856
4th quarter (40th–52d week)	1.462	1.469	1.296	1.163	.928	1.234	.871	.956
1st quarter (1st–13th week)	2.003	1.627	1.760	1.598	1.274	.935	.816	--------
2d quarter (14th–26th week)	1.889	1.858	1.677	1.250	1.060	.781	1.173	--------

TABLE J.—*Excess weekly death rates (annual basis) per 100,000 from influenza and pneumonia, 1935–42*

PACIFIC

Week of year	Smoothed mean 1939–42	1935–36	1936–37	1937–38	1938–39	1939–40	1940–41	1941–42	1942–43
32	27	−2	−9	+10	+19	−15	+9	−2	−9
33	26	+18	+2	+7	−6	−2	0	+4	−5
34	26	−3	+8	+4	−7	+5	+6	−7	−2
35	28	+9	−17	+14	−4	+7	−1	−7	−6
36	28	0	+6	+4	+2	−8	−2	+4	−11
37	32	−6	−12	−11	−20	+1	−2	+3	−2
38	32	−19	−6	+11	−8	−3	−4	−6	−14
39	33	−6	−10	−13	−1	+34	+3	+8	−1
40	34	−4	+1	−12	−9	−8	−2	−8	−2
41	36	−16	−25	+2	+7	−22	−4	+4	+6
42	34	−14	+3	+16	−20	+14	+7	−5	+15
43	36	−12	−1	−20	+12	+5	−2	+11	−4
44	37	+5	−27	−16	−5	+4	−5	−2	+6
45	36	+14	+2	+23	−20	+7	+7	−9	+1
46	36	−1	+3	+2	−2	+6	−9	+4	+11
47	39	+23	+17	−26	−4	−3	−6	−3	+2
48	42	+45	+3	+6	+30	−10	+5	−1	+8
49	45	+23	+22	+2	+32	+13	+43	−10	−5
50	49	−5	+30	+24	+12	−5	+45	+11	+3
51	54	−23	+24	+11	+10	−6	+85	−7	−16
52	57	−14	+1	+22	−6	−2	+106	−4	−6
53	-------	-------	−10	-------	-------	-------	-------	−18	-------
1	59	+49	+60	0	+41	+12	+93	+2	-------
2	63	−1	+53	−7	−7	−5	+46	+9	-------
3	65	+42	+189	+6	−4	−9	+32	+2	-------
4	67	−35	+378	+30	−22	+14	−3	−6	-------
5	66	−34	+284	−24	−16	+7	−3	−9	-------
6	66	−4	+385	+18	−23	+14	−2	+9	-------
7	65	+17	+172	+6	−36	−4	−6	−6	-------
8	65	+36	+88	−7	−2	+16	−4	−19	-------
9	60	+50	+11	−18	+29	−13	+17	0	-------
10	61	+67	+3	−2	−4	+4	−3	+7	-------
11	58	+59	−2	−3	+16	−23	−7	+8	-------
12	55	+5	+12	−22	+27	+10	−3	+16	-------
13	53	−28	−5	−4	+14	+4	−7	−3	-------
14	52	+14	−12	0	−12	−14	+10	−10	-------
15	49	+8	−1	+10	−4	0	−6	+16	-------
16	46	−8	+24	+26	+32	−13	−2	+12	-------
17	45	+19	−4	+5	−3	+1	+2	+18	-------
18	42	+7	+4	−1	−17	+4	−10	−25	-------
19	41	+11	+23	−19	−16	−3	+11	0	-------
20	36	−20	0	+6	−2	+5	+5	+7	-------
21	37	−6	−8	−9	+25	−3	−7	+6	-------
22	33	−9	−21	−6	+12	−2	−9	+1	-------
23	32	+6	+4	−14	−9	+1	+4	+7	-------
24	29	−4	+9	−4	−1	+3	−8	−7	-------
25	29	−7	+1	+8	−12	+3	+10	+5	-------
26	28	−7	−8	+17	−11	−6	−1	−8	-------
27	31	−2	0	−19	+8	−11	0	+3	-------
28	31	0	−17	−10	−8	−1	−1	+8	-------
29	31	−7	−28	−1	−10	+26	+2	0	-------
30	30	+1	−12	+13	+1	−8	+11	+3	-------
31	29	−1	−2	+4	−9	−11	−6	+7	-------

Quarterly factors for adjustment of smoothed mean to obtain annual norms

3d quarter (27th–39th week)	1.556	1.615	1.500	1.240	1.174	0.909	0.894	1.061
4th quarter (40th–52d week)	2.038	2.235	1.766	1.698	1.066	.917	.929	1.392
1st quarter (1st–13th week)	2.110	2.033	1.539	1.565	1.080	.749	1.170	-------
2d quarter (14th–26th week)	1.930	1.928	1.576	1.275	.816	.798	1.311	-------

Influenza and pneumonia deaths from the following 90 cities were used in computing rates for each of the nine geographic sections; the enumerated census population of 1940 is shown for each city:

NEW ENGLAND: Barre 10,909, Boston 770,816, Bridgeport 147,121, Concord 27,171, Fall River 115,428, Hartford 166,267, New Haven 160,605, Portland 73,643, Providence 253,504, Springfield 149,554, Worcester 193,694.

MIDDLE ATLANTIC: Buffalo 575,901, Camden 117,536, Newark 429,760, New York 7,454,995, Philadelphia 1,931,334, Pittsburgh 671,659, Reading 110,568, Rochester 324,975, Syracuse 205,967, Trenton 124,697.

EAST NORTH CENTRAL: Chicago 3,396,808, Cincinnati 455,610, Cleveland 878,336, Columbus 306,087, Detroit 1,623,452, Flint 151,543, Fort Wayne 118,410, Grand Rapids 164,292, Indianapolis 386,972, Kenosha 48,765, Milwaukee 587,472, Racine 67,195, Springfield 75,503, South Bend 101,268, Superior 35,136, Terre Haute 62,693.

WEST NORTH CENTRAL: Duluth 101,065, Fargo 32,580, Kansas City 399,178, Minneapolis 492,370, Omaha 223,844, St. Joseph 75,711, St. Louis 816,048, St. Paul 287,736, Topeka 67,833, Wichita 114,966.

SOUTH ATLANTIC: Atlanta 302,288, Baltimore 859,100, Brunswick 15,035, Charleston, S. C. 71,275, Charleston, W. Va. 67,914, Cumberland 39,483, Frederick 15,802, Lynchburg 44,541, Raleigh 46,897, Richmond 193,042, Roanoke 69,287, Savannah 95,996, Tampa 108,391, Washington, D. C. 663,091, Wheeling 61,099, Wilmington, Del. 112,504, Wilmington, N. C. 33,407, Winston-Salem 79,815.

EAST SOUTH CENTRAL: Birmingham 267,583, Memphis 292,942, Mobile 78,720, Nashville 167,402.

WEST SOUTH CENTRAL: Dallas 294,734, Galveston 60,862, Houston 384,514, Little Rock 88,039, New Orleans 494,537, San Antonio 253,854, Shreveport 98,167.

MOUNTAIN: Billings 23,261, Boise 26,130, Denver 322,142, Great Falls 29,928, Helena 15,056, Missoula 18,449, Pueblo 52,162, Salt Lake City 149,934.

PACIFIC: Los Angeles 1,504,277, Sacramento 105,958, San Francisco 634,536, Seattle 368,302, Spokane 122,001, Tacoma 109,408.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

May 23–June 19, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended June 19, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

DISEASES ABOVE MEDIAN PREVALENCE

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 2,221 for the preceding 4-week period to 1,597 for the 4 weeks ended June 19. There were 288 cases reported for this period in 1942 and the 1938–42 median was 152 cases, the current incidence being more than 10 times that figure. While a decline in the number of cases was apparent in practically all sections of the country during the current period, the numbers of cases in all sections were relatively high. In the New England region the number of cases (161) was about 10 times the median; in the East North Central and Pacific regions the numbers (237 and 145, respectively) were more than 12 times the median; in the West North Central the number (95) was almost 14 times the median, while in the Mountain region the number of cases (68) was 19 times the median. Smaller increases were reported from the other regions. Since the lowest level of this disease is usually reached during the late summer, a further decline may be expected, but the relatively high level that has been maintained since the beginning of the current outbreak in December 1942 will probably continue throughout the remainder of

the year. While the number of cases has fluctuated considerably from week to week, the peak of the current outbreak was, as in most preceding years, reached during the month of April.

For the country as a whole 11,446 cases have been reported since the beginning of the current year, which is a larger number than has been reported for the 12 months of any year in the 15 years for which these data are available. Incomplete morbidity reports and mortality reports from the Bureau of the Census prior to 1929 indicate that the current incidence is probably higher than in any prior year of record.

Number of cases of 9 communicable diseases in the United States during the 4-week period May 23–June 19, 1943, the number for the corresponding period in 1942, and the median number of cases for the corresponding period, 1938–42

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	703	612	777	3,636	2,809	2,809	88,677	62,904	62,904
New England	12	20	20	11	14	10	8,822	6,994	6,994
Middle Atlantic	94	87	144	45	27	29	26,995	9,869	10,115
East North Central	165	181	153	180	226	226	31,697	8,748	8,748
West North Central	46	38	60	74	34	43	5,904	5,225	4,496
South Atlantic	108	95	140	958	895	972	4,621	4,283	6,366
East South Central	42	41	61	153	140	167	1,382	756	1,265
West South Central	109	106	106	1,532	884	864	1,427	2,380	2,637
Mountain	43	41	61	467	376	229	2,789	5,010	2,838
Pacific	84	53	81	216	213	239	5,040	19,639	8,860
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	1,597	288	152	240	97	105	10,123	7,503	10,056
New England	161	29	10	7	6	2	2,061	974	905
Middle Atlantic	494	103	54	11	13	10	2,480	2,098	3,634
East North Central	237	11	19	6	9	9	2,588	2,241	3,799
West North Central	95	17	7	5	11	4	669	700	747
South Atlantic	274	56	25	10	15	15	504	438	518
East South Central	67	22	15	4	11	10	170	244	244
West South Central	56	20	14	62	16	10	175	169	171
Mountain	68	5	4	13	6	6	745	192	197
Pacific	145	25	12	122	10	24	731	447	589
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	46	105	243	374	457	572	16,324	15,027	15,027
New England	0	0	0	24	13	20	963	1,750	1,359
Middle Atlantic	1	0	0	56	62	71	2,449	4,015	3,502
East North Central	17	48	79	35	42	69	3,106	3,502	3,494
West North Central	5	9	90	22	29	31	1,089	475	655
South Atlantic	5	4	4	106	128	128	3,289	1,808	2,160
East South Central	3	8	23	32	42	69	618	771	771
West South Central	10	25	26	72	116	125	2,541	817	1,581
Mountain	2	7	17	11	8	25	578	495	839
Pacific	3	4	6	16	17	45	1,691	1,394	2,087

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.

Influenza.—The 3,636 cases of influenza reported for the current period was about 30 percent above the 1942 incidence for the corresponding period. The 5-year median was represented by the 1942

figure (2,809 cases). Approximately three-fourths of the total cases were reported from five rather widely separated States, viz., Texas 1,447 cases, South Carolina 578, Virginia 266, Colorado 193, and Arizona 173 cases.

Measles.—For the 4 weeks ended June 19 there were 88,677 cases of measles reported, approximately 26,000 more than the normal seasonal expectancy. With the exception of the year 1941, when approximately 111,000 cases were reported for this period, the current incidence is the highest since 1935 when 91,250 cases were reported for the same weeks. Six of the geographic regions reported increases over the 1938–42 medians, the increases ranging from about 10 percent in the East South Central region to about 3.6 times the median in the East North Central region.

Poliomyelitis.—The number of cases of poliomyelitis rose from 118 during the preceding 4 weeks to 240 during the 4 weeks ended June 19. An increase of this disease is expected at this season of the year, but the current rise is somewhat sharper than normally occurs. However, the increase appears to be largely due to an excess of cases in two States, California (116 cases) and Texas (51)cases. In the New England and Mountain regions, the numbers of cases were small but they represented considerable increases over the median. In other regions the cases either closely approximated the median or fell considerably below it.

Scarlet fever.—The incidence of scarlet fever was about normal for this season of the year, the number (10,123) being only slightly above the 1938–42 median. The number of cases in the New England region was more than 2 times the preceding 5–year median and in the Pacific region the number (745 cases) was almost 4 times the median. A minor increase was reported in the Pacific region, but all other regions reported a decline in the incidence.

Whooping cough.—For the country as a whole this disease was slightly above the normal seasonal expectancy. The West North Central and South Atlantic regions reported excesses over the 1938–42 median but in all other regions the incidence was relatively low.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases (703) of diphtheria reported during the 4 weeks ended June 19 was about 15 percent above that for the corresponding period in 1942, but it was lower than the 1938–42 median An excess of cases over the median was reported from the East North Central region, and in the West South Central region the incidence stood at about the normal seasonal level, but in all other regions the incidence was relatively low.

Smallpox.—For the current period there were 46 cases of smallpox reported, as compared with 105 in 1942 and a 5-year median of 243

cases. One case was reported from New Jersey, in the Middle Atlantic region, and in the South Atlantic region the incidence was about normal, but all other regions showed very significant declines from the 1938–42 medians.

Typhoid and paratyphoid fever.—The incidence of typhoid fever was also relatively low, the number of cases (374) being about 80 percent of the number reported for this period in 1942 and about 65 percent of the preceding 5-year median. With one exception, the New England region, the incidence was considerably below the normal seasonal level in all sections of the country.

MORTALITY, ALL CAUSES

For the 4 weeks ended June 19 there were approximately 35,500 deaths from all causes reported to the Bureau of the Census by the group of large cities. The number of deaths reported is 11.1 percent more than the average for the corresponding weeks of the 3 preceding years. Rates for the cities will be published by the Bureau of the Census when current population estimates become available. With the excessive internal migration that has taken place since 1940, no accurate population estimates can be made, so it is uncertain as to how much of the current increase is due to increased population and how much of it represents an increased death rate.

DEATHS DURING WEEK ENDED JUNE 26, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 26, 1943	Corresponding week 1942
Data from 88 large cities of the United States:		
Total deaths	8,918	7,728
Average for 3 prior years	7,928	
Total deaths, first 25 weeks of year	239,607	216,873
Deaths under 1 year of age	595	497
Average for 3 prior years	503	
Deaths under 1 year of age, first 25 weeks of year	16,395	13,831
Data from industrial insurance companies:		
Policies in force	65,572,219	64,967,453
Number of death claims	12,341	10,607
Death claims per 1,000 policies in force, annual rate	9.8	8.5
Death claims per 1,000 policies, first 25 weeks of year, annual rate	10.4	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 3, 1943

Summary

The number of reported cases of poliomyelitis increased from 136 for the preceding week to 190. This increase is accounted for entirely by the increase in 2 States—Texas, from 39 to 80 cases, and Oklahoma, from 8 to 23, or an increase of 56 cases in these 2 States. California reported 57 cases as compared with 58 for the preceding week, and Arizona reported only 3 cases as compared with 6 for the preceding week. For the country as a whole, a total of 1,084 cases has been reported to date, as compared with 609 for the same period in 1942 and a 5-year median of 708 for the period. The total number of cases reported to date this year is above that for any prior year since 1934 (2,099 cases).

The number of cases of meningococcus meningitis reported declined from 335 to 245. For the corresponding week last year, 52 cases were reported. The 5-year (1938–42) median for the week is 36.

For the first half of the current year, the incidence of the following-named diseases is above that for last year: The dysenteries (about 50 percent higher), infectious encephalitis, measles, meningococcus meningitis, poliomyelitis, scarlet fever, smallpox (only slightly higher), endemic typhus fever, and whooping cough. The incidence of anthrax, diphtheria, influenza, Rocky Mountain spotted fever, tularemia, and typhoid fever is below that for last year.

A total of 9,259 deaths was reported for the current week in 89 large cities in the United States as compared with 8,950 last week and a 3-year (1940–42) average of 7,507. For the first half year, 249,541 deaths have been reported in these cities as compared with 225,194 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended July 3, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938-42	Week ended—		Median 1938-42	Week ended—		Median 1938-42	Week ended—		Median 1938-42
	July 3, 1943	July 4, 1942		July 3, 1943	July 4, 1942		July 3, 1943	July 4, 1942		July 3, 1943	July 4, 1942	
NEW ENGLAND												
Maine	0	0	0	------	------	------	111	95	82	3	1	0
New Hampshire	0	0	0	2	------	------	6	27	13	0	0	0
Vermont	0	0	0	------	------	------	148	55	56	1	0	0
Massachusetts	0	0	1	------	------	------	738	444	504	14	1	0
Rhode Island	0	0	0	------	------	------	140	53	53	3	0	0
Connecticut	1	0	0	------	------	------	190	141	141	5	2	0
MIDDLE ATLANTIC												
New York	7	14	14	[1] 3	[1] 3	[1] 2	1,912	611	869	51	9	5
New Jersey	3	2	4	1	5	3	1,310	805	305	16	2	1
Pennsylvania	20	7	7	3	------	------	390	230	260	14	3	3
EAST NORTH CENTRAL												
Ohio	10	7	7	2	1	4	327	90	90	4	1	1
Indiana	1	4	5	9	4	4	109	37	37	1	0	0
Illinois	11	19	19	11	3	7	602	70	182	10	0	0
Michigan [2]	6	3	5	1	------	------	1,158	237	692	17	1	1
Wisconsin	1	1	1	9	12	12	1,245	789	793	1	0	1
WEST NORTH CENTRAL												
Minnesota	1	4	4	2	------	------	266	66	66	3	1	0
Iowa	0	1	1	------	------	2	125	51	64	0	0	0
Missouri	0	1	1	1	------	------	71	31	18	6	1	1
North Dakota	0	0	1	------	1	------	52	9	9	0	0	0
South Dakota	1	0	0	------	------	------	47	2	3	0	0	0
Nebraska	0	1	1	------	2	------	22	32	13	1	1	0
Kansas	2	0	2	2	------	------	69	85	67	8	1	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	6	4	4	1	0	0
Maryland [2]	2	1	1	5	3	------	120	65	47	5	3	1
Dist. of Col.	0	0	1	------	------	------	55	24	24	2	0	0
Virginia	4	8	5	70	42	14	61	59	126	15	2	3
West Virginia	0	2	4	------	------	4	31	27	38	4	0	0
North Carolina	4	4	4	37	1	1	147	66	174	4	0	1
South Carolina	6	1	6	90	37	80	26	34	34	5	0	0
Georgia	4	5	4	2	3	3	63	25	21	4	1	0
Florida	2	1	2	8	------	------	11	22	22	3	2	0
EAST SOUTH CENTRAL												
Kentucky	0	5	3	1	1	5	20	14	71	0	3	3
Tennessee	2	2	3	1	5	5	35	35	32	4	0	0
Alabama	1	6	6	6	3	3	124	15	62	1	0	0
Mississippi [2]	1	2	3	------	------	------	------	------	------	0	0	0
WEST SOUTH CENTRAL												
Arkansas	0	4	2	------	1	2	23	28	28	0	0	0
Louisiana	4	1	4	2	1	4	29	15	11	7	1	0
Oklahoma	1	0	2	6	11	9	9	39	35	1	0	0
Texas	15	11	11	314	135	113	156	99	127	3	6	1
MOUNTAIN												
Montana	0	4	0	6	------	------	96	35	35	0	1	0
Idaho	0	0	0	3	------	------	27	7	10	0	0	0
Wyoming	0	0	0	4	56	------	25	22	6	0	0	0
Colorado	5	7	13	8	9	8	30	61	48	3	0	0
New Mexico	2	1	1	------	------	1	7	11	18	1	0	0
Arizona	0	1	1	43	9	24	18	25	25	0	0	0
Utah [2]	0	0	0	3	1	------	50	283	126	3	0	0
Nevada	1	0	------	------	------	------	15	23	------	4	0	------
PACIFIC												
Washington	7	4	0	------	3	------	138	729	61	2	0	0
Oregon	2	2	4	4	3	6	48	46	46	4	0	0
California	16	5	11	36	15	15	362	1,110	472	16	9	2
Total	143	138	186	695	370	406	10,765	6,333	6,619	245	52	36
26 weeks	6,126	6,314	7,772	77,581	78,126	149,475	509,829	450,664	450,664	12,011	2,019	1,211

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 3, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis, Week ended— July 3, 1943	Poliomyelitis, Week ended— July 4, 1942	Poliomyelitis, Median 1938–42	Scarlet fever, Week ended— July 3, 1943	Scarlet fever, Week ended— July 4, 1942	Scarlet fever, Median 1938–42	Smallpox, Week ended— July 3, 1943	Smallpox, Week ended— July 4, 1942	Smallpox, Median 1938–42	Typhoid and paratyphoid fever, Week ended— July 3, 1943	Typhoid and paratyphoid fever, Week ended— July 4, 1942	Typhoid and paratyphoid fever, Median 1938–42
NEW ENGLAND												
Maine	0	0	0	14	7	7	0	0	0	2	0	1
New Hampshire	0	0	0	2	2	0	0	0	0	0	0	0
Vermont	0	0	0	3	1	3	0	0	0	0	0	0
Massachusetts	0	1	0	169	124	124	0	0	0	1	4	2
Rhode Island	0	0	0	5	5	5	0	0	0	1	1	0
Connecticut	0	0	0	22	11	23	0	0	0	1	1	1
MIDDLE ATLANTIC												
New York	4	1	2	148	108	218	0	0	0	8	2	6
New Jersey	1	0	0	26	37	58	0	0	0	1	2	4
Pennsylvania	0	1	0	63	85	133	0	0	0	11	10	10
EAST NORTH CENTRAL												
Ohio	0	1	1	66	86	86	0	5	1	4	16	8
Indiana	0	1	0	9	14	21	3	0	0	4	0	2
Illinois	0	4	3	48	62	129	1	2	3	1	2	9
Michigan [2]	1	3	1	50	85	126	0	0	0	7	0	3
Wisconsin	0	0	0	82	60	60	0	0	2	0	0	0
WEST NORTH CENTRAL												
Minnesota	1	0	0	9	22	25	0	0	2	1	2	0
Iowa	0	0	0	4	10	15	0	0	8	2	0	0
Missouri	1	1	0	10	12	20	0	1	5	2	5	5
North Dakota	0	1	0	0	3	2	0	0	0	0	1	0
South Dakota	0	0	0	6	3	4	0	0	4	0	1	0
Nebraska	0	0	0	3	4	8	1	0	0	0	0	0
Kansas	3	0	0	17	18	19	1	0	0	3	1	2
SOUTH ATLANTIC												
Delaware	0	0	0	1	8	3	0	0	0	2	1	1
Maryland [2]	0	0	0	20	29	12	0	0	0	1	7	1
Dist. of Col.	0	0	0	7	1	3	0	0	0	0	0	0
Virginia	0	1	1	13	10	7	0	0	0	7	4	5
West Virginia	0	0	0	6	7	13	0	0	0	6	1	3
North Carolina	1	0	1	2	6	12	0	0	0	6	4	6
South Carolina	0	2	2	0	6	2	0	0	0	3	7	7
Georgia	1	1	3	1	7	7	0	1	0	5	16	18
Florida	0	1	1	4	1	1	0	0	0	0	6	2
EAST SOUTH CENTRAL												
Kentucky	0	6	0	9	21	19	0	0	0	8	8	9
Tennessee	0	6	1	9	19	18	0	0	1	6	11	11
Alabama	0	1	1	4	7	7	1	0	0	4	2	4
Mississippi [2]	0	2	2	3	4	2	0	0	0	6	3	8
WEST SOUTH CENTRAL												
Arkansas	3	12	0	1	2	2	0	0	1	7	8	12
Louisiana	1	2	2	6	4	5	0	1	0	6	12	21
Oklahoma	23	0	0	4	4	9	0	0	3	1	1	10
Texas	80	1	3	28	15	18	0	2	2	17	13	21
MOUNTAIN												
Montana	0	0	0	6	8	6	1	0	0	0	0	0
Idaho	0	0	0	1	0	2	0	1	0	0	1	1
Wyoming	0	0	0	17	12	6	0	1	0	0	0	0
Colorado	5	0	0	42	1	15	0	0	0	0	0	1
New Mexico	0	0	1	3	1	6	0	0	0	1	7	7
Arizona	3	3	0	18	2	3	0	0	0	0	1	1
Utah [2]	2	0	0	17	5	5	0	0	0	1	0	0
Nevada	0	0	------	11	0	------	0	0	------	1	0	------
PACIFIC												
Washington	3	0	0	23	8	10	0	0	0	1	0	1
Oregon	0	0	0	4	4	6	0	0	0	0	1	2
California	57	2	7	110	61	75	0	0	0	3	4	6
Total	190	54	79	1,126	1,012	1,415	18	14	38	141	166	240
26 weeks	1,084	609	708	92,168	84,293	110,798	576	568	1,763	1,807	2,878	2,646

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 3, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough, Week ended— July 3, 1943	Whooping cough, Week ended— July 4, 1942	Whooping cough, Median, 1938–42	Week ended July 3, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	19	21	25	0	0	0	0	0	0	0	0	0
New Hampshire	5	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	38	26	0	0	0	0	0	0	0	0	0
Massachusetts	76	180	144	0	0	1	0	4	0	0	0	0
Rhode Island	46	43	13	0	0	0	0	0	0	0	0	0
Connecticut	23	55	58	0	1	30	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	319	379	379	0	14	7	0	3	0	1	0	0
New Jersey	204	246	161	1	0	0	0	1	0	0	0	0
Pennsylvania	287	237	315	0	0	0	0	2	0	1	1	0
EAST NORTH CENTRAL												
Ohio	252	177	236	0	1	0	0	0	0	1	0	0
Indiana	55	38	20	0	0	14	0	0	0	0	0	0
Illinois	165	334	245	0	0	0	0	1	0	0	2	0
Michigan [2]	179	122	208	0	0	2	0	0	0	0	0	0
Wisconsin	288	248	171	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	74	34	34	0	1	0	0	0	0	0	0	0
Iowa	62	27	32	0	0	0	0	0	0	0	0	0
Missouri	42	11	30	0	0	0	0	0	0	0	0	0
North Dakota	6	0	10	0	0	0	0	0	0	0	0	0
South Dakota	7	0	6	0	0	0	0	0	0	0	1	0
Nebraska	7	7	9	0	0	0	0	0	0	0	0	0
Kansas	83	54	54	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	4	1	5	0	0	0	0	0	0	0	0	0
Maryland [2]	163	55	57	0	0	0	0	0	0	8	0	0
Dist. of Col.	36	22	9	0	1	0	0	0	0	0	0	0
Virginia	67	40	54	0	0	0	136	0	0	5	0	0
West Virginia	67	8	57	0	0	0	0	0	0	1	0	0
North Carolina	275	108	253	0	0	0	0	0	0	2	0	0
South Carolina	50	46	46	0	0	26	0	0	0	0	0	2
Georgia	17	45	28	0	1	13	0	0	0	0	1	27
Florida	38	4	7	0	3	0	3	0	0	0	0	9
EAST SOUTH CENTRAL												
Kentucky	69	40	46	0	1	13	0	0	0	0	0	0
Tennessee	58	71	71	0	0	0	6	0	0	0	1	0
Alabama	58	31	31	0	0	0	0	0	0	0	0	14
Mississippi [2]	-------	------	-------	0	0	0	0	0	0	0	1	2
WEST SOUTH CENTRAL												
Arkansas	28	10	19	0	3	61	0	0	0	0	0	0
Louisiana	10	0	14	0	0	38	0	0	1	0	1	7
Oklahoma	16	14	25	0	0	0	0	0	0	1	0	0
Texas	410	137	258	0	17	408	0	2	0	0	0	20
MOUNTAIN												
Montana	18	13	13	0	0	0	0	0	0	1	1	0
Idaho	4	3	6	0	0	0	0	0	0	0	0	0
Wyoming	4	7	5	0	0	0	0	0	0	2	2	0
Colorado	21	24	31	0	0	0	0	0	0	2	0	1
New Mexico	0	17	18	0	0	1	0	0	0	0	0	0
Arizona	19	23	23	0	0	0	19	0	0	0	0	0
Utah [2]	108	31	70	0	0	0	0	1	0	0	0	0
Nevada	6	4	-------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	50	62	62	0	0	0	0	0	0	0	0	0
Oregon	48	20	25	0	0	0	0	0	0	0	0	0
California	203	126	206	0	2	12	0	0	0	0	1	0
Total	4,046	3,237	3,749	1	44	626	164	14	1	25	13	82
26 weeks	106,015	98,514	101,777	35	961	6,344	1,716	288	14	185	478	1,286
26 weeks, 1942	-------	------	-------	42	518	3,201	1,863	224	32	203	501	1,007

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 19, 1943

This table lists the reports from 81 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	87	3	3	0	0	0	0	10
New Hampshire:												
Concord	0	0	------	0	0	1	0	0	1	0	0	0
Vermont:												
Barre	0	0	------	0	1	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	0	189	12	15	0	119	0	0	24
Fall River	0	0	------	0	52	0	0	0	2	0	0	4
Springfield	0	0	------	0	15	0	1	0	18	0	0	0
Worcester	0	0	------	0	14	1	5	0	7	0	0	6
Rhode Island:												
Providence	0	0	1	0	112	3	0	1	11	0	0	19
Connecticut:												
Bridgeport	2	0	------	0	5	0	1	0	1	0	0	1
Hartford	1	0	------	0	10	1	4	0	2	0	0	0
New Haven	0	0	------	0	44	0	1	0	0	0	0	6
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	45	1	2	0	9	0	0	6
New York	5	1	1	1	1,217	39	42	0	149	0	5	70
Rochester	0	0	------	0	158	0	7	0	5	0	0	5
Syracuse	0	0	------	0	45	3	4	0	8	0	1	23
New Jersey:												
Camden	0	0	------	0	1	0	0	0	0	0	0	2
Newark	0	0	------	0	196	1	6	0	5	0	0	41
Trenton	1	0	------	0	3	1	1	0	6	0	0	1
Pennsylvania:												
Philadelphia	0	0	------	1	187	5	11	0	46	0	0	75
Pittsburgh	4	0	------	0	16	4	12	0	17	0	0	37
Reading	0	0	------	0	4	0	1	0	0	0	0	11
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	33	2	1	0	13	0	1	7
Cleveland	2	0	2	0	9	6	9	0	11	0	0	47
Indiana:												
Fort Wayne	0	0	------	0	14	0	2	0	1	0	0	1
Indianapolis	0	0	------	0	29	0	8	0	4	0	0	9
South Bend	0	0	------	0	20	0	0	0	1	0	0	4
Terre Haute	0	0	------	0	0	0	2	0	0	0	0	0
Illinois:												
Chicago	11	0	1	1	325	7	22	0	40	0	1	51
Springfield	0	0	------	0	0	1	0	0	2	0	0	1
Michigan:												
Detroit	3	0	------	0	871	9	13	0	19	0	0	81
Flint	0	0	------	0	43	0	0	0	0	0	0	7
Grand Rapids	0	0	------	0	109	0	0	0	2	0	0	8
Wisconsin:												
Kenosha	0	0	------	0	1	0	0	0	3	0	0	1
Milwaukee	0	0	------	0	275	1	2	0	70	0	0	43
Racine	0	0	------	0	4	0	0	0	11	0	0	2
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	1	136	1	0	0	3	0	0	6
Minneapolis	0	0	------	0	19	2	6	0	1	0	0	10
St. Paul	0	0	------	0	30	0	5	0	1	0	0	48
Missouri:												
Kansas City	1	0	------	0	50	0	4	0	11	0	0	7
St. Joseph	0	0	------	0	0	0	0	0	0	0	0	0
St. Louis	0	0	1	0	62	5	11	0	6	0	0	28

City reports for week ended June 19, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	2	0	------	0	2	0	1	0	1	0	0	1
Kansas:												
Topeka	0	0	------	0	20	1	1	0	1	0	0	5
Wichita	0	0	------	0	0	0	6	0	0	0	0	13
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	7	0	4	0	0	0	0	2
Maryland:												
Baltimore	0	0	1	0	119	5	4	0	25	0	0	117
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
Dist. of Col.:												
Washington	0	0	------	0	74	3	8	0	10	0	1	29
Virginia:												
Lynchburg	0	0	------	0	9	0	0	0	1	0	0	26
Richmond	0	0	------	0	24	2	1	1	0	0	0	12
Roanoke	0	0	------	0	0	0	0	0	0	0	0	5
West Virginia:												
Charleston	0	0	------	0	1	0	0	0	0	0	0	0
Wheeling	0	0	------	0	2	0	3	0	0	0	0	24
North Carolina:												
Wilmington	0	0	------	0	1	0	3	0	0	0	0	11
Winston-Salem	0	0	3	0	0	0	2	0	0	0	0	30
South Carolina:												
Charleston	0	0	2	0	0	0	3	0	0	0	0	1
Georgia:												
Brunswick	0	0	------	0	1	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	0	0	0	0
Florida:												
Tampa	0	0	------	0	1	0	3	0	0	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	1	0	24	1	4	0	4	0	0	13
Nashville	1	0	------	0	1	0	1	0	0	0	0	8
Alabama:												
Birmingham	0	0	2	0	24	0	2	0	0	0	0	5
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	0	0	0	0	0	1
Louisiana:												
New Orleans	1	1	2	1	4	0	8	1	2	0	1	2
Shreveport	0	0	------	0	0	0	1	0	0	0	0	0
Texas:												
Dallas	3	0	------	0	3	0	2	2	0	0	0	22
Galveston	0	0	------	0	0	0	1	7	0	0	0	12
San Antonio	0	0	------	0	1	0	5	0	2	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	12	0	1	0	0	0	0	0
Great Falls	0	0	------	0	6	0	0	0	1	0	0	6
Helena	0	0	------	0	1	0	0	0	0	0	0	0
Missoula	0	0	------	0	5	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	4	0	28	0	5	0	4	0	1	9
Pueblo	0	0		0	4	1	0	0	2	0	0	6

City reports for week ended June 19, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0		0	85	0	7	0	3	0	0	8
Spokane	0	0		0	19	1	2	0	2	0	0	6
Takoma	0	0		0	1	0	0	0	0	0	0	1
California:												
Sacramento	0	0		0	1	2	1	0	2	0	0	5
San Francisco	3	0	2	0	46	3	10	1	29	0	0	27
Total	43	2	23	6	4,957	128	290	13	689	0	12	1,110
Corresponding week, 1942	65	1	32	8	3,776	26	206	7	497	3	15	1,144
Average, 1938-42	65		25	[1] 13	[2] 3,357		[1] 235		791	7	24	1,111

Dysentery, amebic.—Cases: New York, 2.

Dysentery, bacillary.—Cases: Portland, 1; Buffalo, 7; New York, 5; Philadelphia, 1; Washington, 1; Charleston, S. C., 1.

Dysentery, unspecified.—Cases: Little Rock, 3; San Antonio, 17; Denver, 1.

Rocky Mountain spotted fever.—Cases: Washington, 1.

Typhus fever.—Cases: Tampa, 1; Dallas, 1.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 81 cities in the preceding table (estimated population, 1942, 31,780,000)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
NEW ENGLAND	0.9	0	2.5	0	1,314	52.2	74.5	2.5	400	0	0	174
MIDDLE ATLANTIC	4.5	.4	.4	.9	835	24.1	38.4	0	107	0	2.7	121
EAST NORTH CENTRAL	10.3	0	1.8	1.2	1,054	15.8	35.9	0	108	0	1.2	159
WEST NORTH CENTRAL	5.9	0	2.0	2.0	631	17.8	67.2	0	47	0	0	233
SOUTH ATLANTIC	0.0	0	11.5	0	450	19.1	59.2	1.9	69	0	3.8	491
EAST SOUTH CENTRAL	6.8	0	20.3	0	331	6.8	47.3	0	27	0	0	176
WEST SOUTH CENTRAL	15.2	3.8	7.6	3.8	30	0	64.5	37.9	15	0	3.8	144
MOUNTAIN	10.6	0	42.3	0	592	10.6	63.4	0	74	0	10.6	222
PACIFIC	11.1	0	7.4	0	563	22.2	74.1	3.7	133	0	0	174
Total	7.1	.3	3.8	1.0	813	21.0	47.6	2.1	113	0	2.0	182

PLAGUE INFECTION IN NEW MEXICO

Plague infection has been reported proved in a pool of 16 fleas from 9 grasshopper mice, *Onychomys leucogaster*, taken June 11 on State Highway No. 18, 12 miles south of Clayton, Union County, New Mexico.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended June 12, 1943, 1 plague-infected mouse and 1 plague-infected rat were reported in Honokaa, and 3 plague-infected rats were reported in Paauhau area, all in Hamakua District, Island of Hawaii, T. H.

Panama Canal Zone

Notifiable diseases—April 1943.—During the month of April 1943, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	17		8		5		2		32	
Diphtheria	5	1	2		[1] 2		7		16	1
Dysentery (amebic)	2		1				1		4	
Dysentery (bacillary)					1				1	
Malaria [2]	11				295		92	1	398	1
Measles	4				10		2		16	
Mumps	51		1		36		4		92	
Pneumonia		10		5	37	1		2	[3] 37	18
Scarlet fever			1		1		1		3	
Tuberculosis		27		17	11	1		4	[3] 11	49
Typhoid fever							1		1	
Whooping cough		1			1				[3] 1	1

[1] Exclusive of 16 carriers.
[2] 143 recurrent cases.
[3] Cases reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 5, 1943.—During the week ended June 5, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Bruns-wick	Que-bec	On-tario	Mani-toba	Sas-katch-ewan	Alber-ta	British Colum-bia	Total
Chickenpox	1	31		119	327	48	12	26	116	680
Diphtheria	1	10	4	20	3	2	2		1	43
Encephalitis, infectious					2					2
German measles		5		25	156	22	5	59	21	293
Influenza			2		562	6	32		273	875
Measles	1	71		220	1,520	100	82	213	351	2,558
Meningitis, meningococcus				1	7	1	2		1	12
Mumps	1	80	3	72	680	72	30	63	99	1,100
Scarlet fever	2	20	18	66	212	43	51	80	47	539
Tuberculosis	2	4	6	132	56	17	15	31	42	305
Typhoid and paratyphoid fever			1	7	4					12
Undulant fever				1	4					5
Whooping cough				61	175	32	14	23	61	366

JAMAICA

Notifiable diseases—4 weeks ended June 5, 1943.—During the 4 weeks ended June 5, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	9	28	Scarlet fever		2
Diphtheria	8	3	Tuberculosis	30	46
Dysentery		2	Typhoid fever	8	31
Leprosy	1	4	Typhus fever	2	
Puerperal fever		3			

NEW ZEALAND HOSPITAL SHIP

Smallpox.—A report dated May 14, 1943, states that an outbreak of smallpox had occurred on a hospital ship carrying New Zealand personnel from the Middle East to New Zealand; one patient who was disembarked at Colombo subsequently died. All measures of isolation, disinfection, and vaccination had been carried out.

SPAIN

Malaria.—Information dated June 24, 1943, states that tertian malaria has reached epidemic proportions in Spain, where according to official reports more than 15,000 cases with 20 deaths have recently occurred. Most of the cases are reported from the following Provinces in the order of highest incidence: Caceres, Badajoz, Cordoba, Ciudad Real, Cadiz, Avila, Toledo, Alicante, Jaen, Salamanca, and Murcia.

SWITZERLAND

Notifiable diseases—August–November 1942.—During the months of August, September, October, and November 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	August	September	October	November
Cerebrospinal meningitis	3	7	4	8
Chickenpox	99	106	105	142
Diphtheria	120	169	180	223
Dysentery	8	515	424	70
German measles	13	10	5	5
Influenza			4	3
Lethargic encephalitis		2	2	
Measles	119	166	65	105
Mumps	85	87	104	188
Paratyphoid fever	28	31	35	8
Poliomyelitis	132	166	57	33
Scarlet fever	192	304	226	287
Trachoma		1		
Tuberculosis	369	322	201	215
Typhoid fever	26	9	5	5
Undulant fever	11	14	4	5
Whooping cough	126	105	92	98

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Morocco—Casablanca.—For the period June 1–10, 1943, 2 cases of plague with 1 death were reported in Casablanca, Morocco.

Smallpox

Algeria.—For the period May 21–31, 1943, 20 cases of smallpox were reported in Algeria.

British Guiana—Georgetown.—For the week ended June 5, 1943, 1 case of smallpox was reported in Georgetown, British Guiana.

Dahomey.—For the period May 1–10, 1943, 101 cases of smallpox were reported in Dahomey.

Indochina (French).—For the months of April and May 1943, 1,114 cases of smallpox were reported in French Indochina including 343

cases in Annam, 50 cases in Cambodia, 365 cases in Cochinchina, and 356 cases in Tonkin.

Mexico.—For the month of March 1943, 11 cases of smallpox with 1 death were reported in San Luis Potosi, and 12 cases with 1 death were reported in Vera Cruz, Mexico.

Portugal—Lisbon.—During the week ended June 5, 1943, 10 cases of smallpox were reported in Lisbon, Portugal.

Sudan (French).—For the period May 1–10, 1943, 143 cases of smallpox with 8 deaths were reported in French Sudan.

Turkey.—During the month of April 1943, 1,201 cases of smallpox (including 277 cases in Istanbul) were reported in Turkey.

Typhus Fever

Algeria.—For the period May 21–31, 1943, 428 cases of typhus fever were reported in Algeria.

Guatemala.—For the month of May 1943, 45 cases of typhus fever with 16 deaths were reported in Guatemala.

Mexico.—For the month of March 1943, typhus fever was reported in certain towns of Mexico as follows: Guadalajara, 6 cases: Mexico, D. F., 148 cases, 32 deaths; Oaxaca, 2 cases; Queretaro, 4 cases; Toluca, 3 cases.

Rumania.—For the period June 8–15, 1943, 176 cases of typhus fever were reported in Rumania.

Slovakia.—For the week ended June 5, 1943, 19 cases of typhus fever were reported in Slovakia.

Spain.—For the period April 18–30, 1943, 58 cases of typhus fever were reported in Spain.

Turkey.—For the month of April 1943, 747 cases of typhus fever (including 71 cases in Istanbul) were reported in Turkey.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Vol. 58 • JULY 16, 1943 • *No. 29*

OPENING REMARKS TO THE FORTY-FIRST ANNUAL CONFERENCE OF THE UNITED STATES PUBLIC HEALTH SERVICE WITH THE STATE AND TERRITORIAL HEALTH OFFICERS [1]

By THOMAS PARRAN, *Surgeon General, United States Public Health Service*

Since the meeting of this group a year ago we have all had an opportunity to become inured to the added responsibilities and difficulties of work under wartime conditions. Then, our country had been in the conflict only a few months. All of us realized that a task of tremendous proportions lay ahead, but we had little experience on which to base our action. Today, I am sure, we see the immediate future in much better perspective than we did then. Our plans have been put to severe tests, and not all of them have met with success We are being schooled in many kinds of adversity. As a result, we approach the coming year with a grimmer determination to carry on and a better understanding of what the task involves.

To date, our casualties have not been heavy either on the battlefronts or at home. For us, however, the war is still in its initial phase. We know that heavy military losses must be sustained when we really come to grips with the enemy on his territory. We know, too, that as the war brings increasing strains on the home front the opportunities for the spread of disease will be enhanced.

Already there are warning signs which cannot be disregarded. The incidence of meningococcus meningitis during the past year, for example, has been far above normal. It is true that improved therapeutic measures have reduced the percentage of fatalities from this disease. Nevertheless, if meningitis should reach epidemic proportions and large outbreaks should occur in military camps and crowded industrial centers great disorganization of war activity would result.

The incidence of influenza during the last year has been considerably below that of the preceding year. Yet, recollection of the devastation wrought by the pandemic during the last world war is a source of constant anxiety today. Some observers see a possibility of a repeti-

[1] Presented to the Forty-first Annual Conference of the United States Public Health Service with the State and Territorial Health Officers, Washington, D. C , March 24, 1943.

tion of the 1918 disaster. While the extent of present knowledge concerning influenza does not permit a definite prediction of such an event, we must admit the existence of environmental and other factors which would favor transmission of influenza should a serious outbreak occur.

The recent prevalence of virus pneumonias, for which no effective therapeutic agents have yet been developed, is also a matter of concern.

A substantial increase in murine typhus fever has been noted throughout the South Atlantic seaboard States. During 1942, more than 3,700 cases were reported, an increase of 1,000 over the previous year. The actual number of cases, however, is known to be much higher than indicated by official reports. In some places, 4 or 5 cases have been discovered for each one reported. While there appears to be no cause for general alarm over the typhus situation, the increase in the rates during the last 10 years, and especially during the last year, indicates that more aggressive rodent control is needed in the endemic areas.

There is also evidence that rodent plague is on the upswing in the western States. Plague control units operating in the endemic regions are experiencing less difficulty than formerly in finding infected animals and parasitic vectors. Control measures have been instituted in several areas used for military training and field maneuvers. The most disturbing fact about rodent plague is its appearance in centers of population. Formerly, infection was limited to sparsely settled regions where the possibility of transmission to human beings was not great. Now, however, infected rats and fleas are being found with increasing frequency in and around Tacoma, Wash. It is likely that infection was introduced from rats on ships, but another possibility is that the disease has spread from woodland rodents to the urban rats. While no human cases have yet occurred in the Puget Sound area, this may be because winter conditions have kept the flea index at a very low level. With warmer weather, there may be a different story to tell. The situation is being watched closely, and control measures are being carried out.

The unusual strain placed upon sanitation and food-handling facilities in many war communities has been reflected in a noticeable increase in gastro-intestinal ailments. As manpower and material shortages grow more pronounced, this trend will undoubtedly continue. Preparation for emergency treatment of water supplies, more careful supervision of milk supplies, and closer regulation of food-handling establishments are therefore essential.

So far the country has escaped the usual wartime epidemics of venereal diseases. This is perhaps due more to the momentum acquired during the period 1938–42 than to current all-out effort.

There was a 20-percent increase last year in the number of patients admitted to clinics, and also an increase in the number of cases reported by private physicians. A large part of this increase, possibly all of it, can be accounted for by the great increase in the number of serological tests performed and the general intensification of case finding throughout the country.

During the past 6 months, distribution of arsenical drugs by the States has increased 20 percent; distribution of sulfonamides, more than 50 percent; and the number of blood tests performed in public laboratories, 50 percent. Another encouraging development is the progress of the rapid treatment center program. Already, 27 projects in 15 States have been approved.

Every phase of health department activity has been adversely affected by the shortage of trained workers. During the past year the Public Health Service has continued to aid the States by recruitment and assignment of emergency health and sanitation personnel. Activities in which this emergency force is employed include venereal disease control, malaria control, industrial hygiene, and the maintenance of general public health services in war areas.

The Public Health Service is prepared to ask Congress for additional funds to augment this form of aid where a definite war-connected need exists. By this I mean well-authenticated cases of local need brought about by war conditions which, if not remedied, would result in substantial interference with the war effort. I might add that the burden of establishing proof of need will be upon the State health officer. In each instance, a watertight case will have to be made before the Public Health Service can present the request to the Budget Bureau and the Congress with any hope of favorable action.

Last year I expressed the hope that the States would transfer some of the emergency health and sanitation personnel to the State pay rolls. Unfortunately, most States did not find this altogether feasible, and it has not been done to any substantial degree. It is gratifying to note, however, that a few States have taken steps to meet their personnel needs through maximum use of their own resources. North Carolina, and more lately West Virginia, have instituted State recruiting and orientation training programs for emergency health workers. I am sure that all of you will be interested in hearing from Dr. Reynolds and Dr. McClintic concerning the results of their initiative in this field. Other States and a few cities have done some recruiting and training, but so far as I am aware only North Carolina and West Virginia have developed a broad and systematic program.

In no field, perhaps, is the shortage of personnel felt more keenly than in nursing. In order to meet the continuing demands of the military forces, and to provide a sufficient residue of nurses for civilian duty, the Public Health Service is presenting to Congress a

bill for the establishment of a Student War Nursing Reserve. The recruitment goal for the next year is 65,000 students—10,000 more than the number sought this year. The proposed plan requires that participating nursing schools shorten by 6 to 12 months the standard 36-month course of instruction. Tuition and entrance fees, as well as maintenance for a limited period, would be provided for all students who matriculate and join the Reserve. Each member of the Reserve would receive a monthly stipend and would agree to serve in whatever capacity she was needed for the duration of the war and 6 months thereafter. Upon completion of the shortened training course, nurses would be assigned to military or governmental hospitals, or to civilian service as needed.

I know that there have been many disappointments because community facilities applied for under the terms of the Lanham Act have not been provided, or have been delayed. The difficulty has been the drastic curtailment in the amount of construction materials available and a corresponding change in the viewpoint of the Federal agencies involved in the program. When most of the projects were first outlined, few had any notion of how restricted the supply of building materials would become. For that reason projects were approved if it was believed that they were needed. Then the War Production Board, which has the responsibility for husbanding essential materials, came into the picture, and procedures had to be drastically revised. Indispensability rather than need became the deciding factor. Now, unless it can be demonstrated that a community cannot get along without the requested facility, the materials for its construction will not be released.

Applying the War Production Board's criterion of dire necessity, the accomplishments of the program have not been negligible. On February 15, actual construction of 153 hospital and health center projects had been undertaken. On that date, 35 of these projects were complete, 25 were from 90 to 99 percent complete, and 93 were less than 90 percent complete. With regard to sanitation facilities, 372 projects were under construction on January 30, 1943. Of these, 98 were complete, 43 were 90 to 99 percent complete, and 231 were less than 90 percent complete.

There has also been considerable delay in developing a satisfactory method for meeting the medical-care needs of communities depleted of physicians by the demands of the armed forces for medical personnel. A cooperative plan of action has been drawn up by the Procurement and Assignment Service and the Public Health Service, and is now being put into effect. This plan involves joint surveys by the two agencies to determine community needs. State health officers can expedite the process by promptly informing the State Chairman of Procurement and Assignment or the Public Health Service District

Director of any areas in need of additional physicians or dentists. When a joint survey reveals a serious medical or dental care shortage, the plan provides that the Procurement and Assignment Service shall try to induce practitioners to move from better supplied localities to the area where the need exists. In a number of instances this has been achieved. It is recognized, however, that persuasion alone will not always suffice to bring about the necessary relocations. Therefore, the Public Health Service is requesting funds which will enable it, when necessary, to defray the moving expenses of relocated physicians, as well as to grant them subsidies which will bring their income up to a guaranteed minimum level. In some instances it may be necessary for the Public Health Service to provide a full-time medical or dental officer.

There are indications that during the next year a large number of people will be recruited and moved by the Government to agricultural areas for work on farms. Any such mass migration will certainly give rise to many health problems, and will create a need for health department services. Until the scope and scheme of organization of such a plan are more clearly defined, it is impossible to say just what it will entail, but we must obviously be prepared to assume some responsibility in whatever program is evolved.

Finally, I should like to say a few words about post-war planning. Some of you may feel that discussion of post-war problems at this time is premature—that it is an attempt to escape the grim reality of the present. Nevertheless, I believe that unless we give earnest consideration to the future we shall be poorly prepared to face the problems that will arise. I do not believe it is an exaggeration to state that these problems will in many respects be as difficult to solve as those facing us now.

One thing I believe is certain. Like the last war, this one will develop an increased public appreciation of what medical and sanitation services have to offer. People who have witnessed the effectiveness of organization for war will not be disposed to scrap this organization and return to a standard of living and public services which they know to be far below our level of achievement.

The people and Government of Great Britain, who have known the reality of war much more intimately than we, have realized the necessity for post-war planning now. Even with their country under bombardment by the Luftwaffe, the Beveridge Report has captured and held the attention of the entire nation. Recently I received a communication from Dr. Wodehouse which indicates that Canada has proceeded farther than we have in the development of plans for health services, especially organized medical care. I hope that during the course of the Conference our colleagues from

across the border will have something to say regarding developments there.

In the United States, similar plans are now being shaped. I believe that State health agencies should show a greater interest in these blueprints of the future, and should give all possible assistance in formulating them. Such interest and participation would seem to be essential if we are to preserve our traditional Federal-State relationships in the organization and administration of health services.

This does not mean that there need be any relaxation of effort in present war activities. It merely means that we must be prepared to apply the experience gained during the war to the problems that will confront us after hostilities cease.

COMMUNITY SERVICES VS. LOST MAN-HOURS [1]

By Paul V. McNutt, *Chairman, War Manpower Commission*

The most urgent need today is manpower—manpower for fighting and for producing.

The size of our fighting force has been the subject of much controversy. Our ultimate military strength has been set for nearly 11 million men. But I will say that by the end of 1943 about 62.5 million Americans will be in the armed services and the labor forces.

Actually, these 62.5 million people will constitute the army of the United States. For, regardless of whether they wear Army olive drab, Navy blue, or civilian work clothes, each of them is an essential part of the machine that is going to crush the Axis.

When this army of 62.5 million has been fully mustered we shall have reached about the limit of our effective human resources. Therefore, the utmost use must be made of every individual. Unnecessary casualties can no more be tolerated at home than on the battle front.

The Army and Navy Medical Corps will look after the health and safety of the millions who do the fighting. The task of protecting the other millions, as well as the remainder of the population, is largely yours. It is as heavy a responsibility as rests on any group today.

That is the situation, stated as simply as possible. Let us consider briefly some of the problems it raises.

An increase in industrial accident and disability rates is already being noted. The strongest and best workers have gone to war. As the labor supply diminishes, physical and medical standards required for employment are progressively relaxed. Some personnel directors report that waivers for physical defects are given to approxi-

[1] Presented to the Forty-first Annual Conference of the United States Public Health Service with the State and Territorial Health Officers, Washington, D. C., March 24, 1943.

mately half of the new people hired. Women, adolescents, the aged, and the physically handicapped, many of whom have never before been employed, are flocking to the factories and we hope in ever increasing numbers to the fields.

The work required of these new workers is heavier than their tasks in peacetime. Hands that never operated anything more formidable than a vacuum cleaner must now take over the punch press and the harvester. New materials and processes give rise to new hazards. Longer working hours, night work, and swing shifts interfere with normal eating and sleeping schedules, increase fatigue, and render the worker more subject to accidents and sickness.

Obviously, a tremendous industrial hygiene task must be done during the next year or two if production schedules are to be met. How well are we equipped for this task?

There has been considerable improvement in industrial hygiene facilities since the beginning of the emergency, especially in the larger factories. But many of the smaller plants—the ones employing less than 500 workers—have little or nothing in the way of an industrial hygiene program. Such plants employ approximately two-thirds of the total labor force. They need the help of the State and local health departments. Yet, the combined industrial hygiene staffs of Federal, State, and local official agencies include only 500 persons. Ten States have no industrial hygiene services whatever at the State level, and most States with industrial hygiene bureaus have only a bare nucleus of organization. Within the next year existing Federal, State, and local industrial hygiene forces cannot hope to serve more than 7,000 plants employing a total of 3,000,000 workers.

In conformity with the principle of State responsibility in health matters, Federal funds for the expansion of industrial hygiene services have been devoted to strengthening the State organizations. Rather than build up a strong centralized bureau working out of Washington, the United States Public Health Service has used emergency funds to recruit and train personnel for assignment to the States. About 60 industrial hygiene workers have been assigned to 30 States, and valuable equipment has been loaned for State use.

But this Federal aid goes only a little way towards meeting current needs. It is nothing more than a leaven, intended to produce a ferment which is long overdue and which is now imperative. As State health officers you have the primary responsibility for speeding up this process—for seeing to it that your States make an ever more substantial contribution to conservation of manpower through adequate health services on the job.

You have also a much broader responsibility—that of providing and maintaining those community services without which no amount

of industrial hygiene in the narrow sense will keep the worker at his task.

Industrial accidents and occupational disability, serious as they are, account for only a small proportion of lost working time. Of far greater importance are those unsatisfactory conditions in the home and community which expose the worker to disease, fatigue, and lowered morale.

There has been much loose talk about "absenteeism" in industry. Some have used the subject as a whetstone upon which to grind their own axes. The word itself has become an epithet rather than a descriptive term. To any one who takes the trouble to look thoroughly into the matter of absences from work, however, it is evident that the real causes are numerous and complex.

To meet some phases of the problem, undoubtedly education and moral suasion are necessary. But there are other aspects of the problem which are of an engineering and a medical nature. These can be better solved if approached in the objective spirit of your distinguished sciences than if approached with invective and emotion.

The War Manpower Commission will not shirk one iota of its responsibility for seeing that manpower is utilized effectively every minute it is on the job—for a full work week. But it will not approach the problem with the calling of names or with the abuse of either management or labor.

We have faith in the American system. We have faith that management can be relied upon and that labor can be relied upon to face the facts. We will work with them quietly, with all the facts on the table, to reach a joint solution of our common problem.

Whatever approach others may choose to take, we have faith in our fellow Americans.

While statistical data on absence from work are deficient, scattered reports indicate that it ranges from 2 and 3 percent normally to 10 or 15 percent and higher among broad segments of the working force.

Undoubtedly, an increase in work absences is inevitable under present conditions. New workers and especially women who are unused to factory routine may be absent more frequently than men, older persons more often than those of normal working age, and night workers more often than those employed in the daytime. Furthermore, youngsters on their first jobs and with their first real money to spend are apt to be somewhat irresponsible. Among the vast number of new workers in these categories are many who do not readily adjust themselves physically or temperamentally to the rigorous demands of war production.

Nevertheless, the fact that absence rates vary so much even among plants engaged in the same type of work indicates that there are variable causative factors which are subject to control. Some of these

factors are a direct concern of the health officer, and many of them are closely related to the health department's activity.

In normal times, sickness and disability are conceded to be the chief causes of lost working time. Under present abnormal conditions, certain other factors probably play an even greater part than sickness in causing work absences. Nevertheless, maintenance of adequate public health and medical services is still one of the main lines of attack in preventing lost man-hours.

Although we have had no serious outbreaks of the communicable diseases, the incidence of certain of these diseases, notably meningococcus meningitis, is far above normal, and should remind us that there is no cause for complacency. Basic sanitation services are reported to be grossly inadequate in many vital areas, and disabling gastro-intestinal ailments are occurring with increasing frequency. I was astonished to learn recently that a city which is a leading center of war activity had only two sanitary inspectors to take care of some 900 restaurants. Two additional inspectors have since been provided.

Clinic services are likewise inadequate in many places. Facilities for the prevention and treatment of venereal diseases have not been expanded in proportion to current needs. In some instances a reorganization of existing control services would go far towards meeting the increased needs in this field. If health departments would link their control programs more closely to local industrial establishments, enlisting the cooperation of both labor and management, they would contribute more effectively to conservation of essential manpower. They would also reduce the civilian reservoir of infection which is a constant problem to the military authorities.

Tuberculosis also presents a threat of serious proportions to complete utilization of our human resources. The composition of the new labor force and the increasing rigor of wartime living point to a rise in tuberculosis rates. Great Britain has already experienced such a rise, and we shall too unless more aggressive control measures are undertaken. More extensive case-finding is necessary, especially in industry. Those capable of spreading infection must not be permitted to jeopardize others who work beside them. When cases are found they must be adequately followed up and treated. This will require improvement of follow-up services and expansion of treatment facilities.

The removal of a large proportion of physicians and dentists from civilian practice has made it difficult for many people to obtain general medical and dental care. Reorganization of existing medical, dental, and hospital service for more complete, more economical, and more efficient service is needed in many communities.

Two years ago the high proportion of men rejected for military service because of physical defects was the subject of much discussion.

The need for rehabilitation services was stressed repeatedly. Yet, today we remain about where we were then in regard to this important matter.

With large numbers of American mothers in war work, child health services assume greater importance than ever before. When a woman war worker's child is ill the woman stays home, and her time is as completely lost to industry as if she herself were sick. Protection of children's health is therefore a means of holding workers on the job every day and maintaining production schedules.

The war has given prominence to a new problem—that of providing day care for young children so that mothers can take a place in the production lines. The health departments have an important role to play in seeing that the health of the children of working mothers is protected and that adequate food and care are given them.

Inadequate transportation is not essentially a health problem, but it is an important factor in causing fatigue, and therefore illness. The organization of community shopping services so that workers can get into the stores during their off hours, or so that there will be something left for them to buy when they get there, is not intrinsically a health problem. But shopping facilities do have a bearing on nutrition, and therefore on health and physical fitness.

Housing is a field which has received only slight attention from official health agencies. Yet, here the relationship to health is more clearly established. I recall a recently published account of conditions near a large aircraft plant. The reporter described one house where five persons lived on the first floor, five in the basement, four on the second floor, and nine in the garage. Four trailers were crowded into the back yard. A pit privy constituted the only sanitary facilities for this colony, and a shallow well the only water supply. The grounds were poorly drained, and filth and refuse littered the area.

Such conditions not only invite sickness, but they are responsible for a great deal of lost time on another score. No one chooses to live in such surroundings, and if forced to do so for a time he finds something better just as soon as he can. The constant search for a decent place to live ranks high among the causes of work absences. If the search proves futile, the worker often quits his job and moves to another community where he hopes to find better accommodations. Thus he loses more time from his work, and the employer must find and train someone to replace him.

Nutrition is a factor of the utmost importance in keeping the worker on his job and maintaining his efficiency. As the manpower and food shortages grow more acute the provision of an adequate diet becomes increasingly difficult. But the nutrition problem today, insofar as it concerns the war worker, is more a question of distribution than supply. Food is available, but often the facilities for serving it

in a manner that will do justice to a worker's appetite and bodily needs are not. Restaurants are overcrowded and unsatisfactory. Often they are not open when the worker can patronize them, and he is forced to resort to the hot dog stand or the hamburger counter. It is futile to expect the utmost in energy and performance on the kind of fare that is available to many essential workers at the present time.

The Nutrition Division of the Office of Defense Health and Welfare Services, recently transferred to the Food Distribution Administration, Department of Agriculture, has developed a nutrition program to promote State and local action leading to wise utilization of food supplies and better diets for the people. Considerable attention is being devoted to industrial feeding as a method of promoting better nutrition and health among industrial workers. The United States Public Health Service is intensely interested in this program and is cooperating in many of its aspects. A nutrition committee has been set up in each State, and local committees have been formed in about 3,000 counties. Where they have not done so already, health departments should identify themselves with those committees and assist them in working out a solution of the local problems. I regret to say that in some States the official health agencies and the organized medical profession did not even show sufficient interest to name representatives to the committees.

Finally, I should like to stress the need for better recreational facilities and services—the kind of recreation that will bring workers back with full productive power to their tasks, the kind of recreation that will increase their drive rather than diminish it, that will lift their spirits rather than depress them. War workers as well as service men need relief from the strain and tedium of the job when their working day is over. Instead, they often find a tedium that is almost equally depressing in the communities where they live. In many of our new cities there is no place to relax or to find wholesome entertainment.

The need for recreation as a morale builder in the armed forces has been recognized and met in a capable manner through the open-handed and open-hearted hospitality of the people in the communities, ably assisted by the Recreation Section of the Office of Defense Health and Welfare Services, the USO, Red Cross, and other groups giving supplementary assistance. Recreation facilities and programs for war workers are badly needed in hundreds of communities today, and would pay rich dividends in stability of the working force and increased industrial output. In some localities where a real effort has been made to solve this problem the results have been most gratifying. The workers and their families feel that they are a part of the community, and their role in the war effort has become clearer and more meaningful to them.

These several factors—industrial hygiene; sanitation; medical, dental, and hospital care; clinics for prevention, treatment, and rehabilitation; child care; community shopping services; nutrition; housing; recreation; and morale—are all parts of the intricate manpower picture. At this Conference, I should like to have you take that broad view of the manpower problem. Do not restrict your discussions to those aspects of it which have a bearing on your traditional activities. Coming from the Association of State and Territorial Health Officers, your recommendations will command the attention of the Nation, and will give impetus to constructive action by Federal, State, and local authorities.

Our military leaders are now planning an offensive against the Axis fortress of Europe. Their task calls for a supreme degree of coordination, for consideration of the minutest details. Here on the home front we, too, must coordinate every phase of the attack on lost and wasted manpower.

In this crucial year of 1943, let us not fail in *our* offensive because of faulty strategy. Let us not neglect a single opportunity to keep our army of producers on the job and fit for duty. Only if we do our part well will those on the battle fronts have the wherewithal for a quick and decisive victory.

THE OUTLOOK FOR THE COMING YEAR [1]

By JOSEPH W. MOUNTIN, *Assistant Surgeon General, United States Public Health Service*

Judging from the tasks that have been outlined by the Surgeon General and the Administrator, I would say that the outlook for the coming year is one of full employment, including plenty of overtime.

In the past, health officers have never had to look for things to do. Instead, their problem has been to find the money to finance enterprises they wished to undertake. Now we are in the rather unusual position of having fairly adequate funds but not enough qualified workers.

First, I shall present a brief résumé of the funds which the Public Health Service expects to have available for assisting the States during the ensuing fiscal year. Please bear in mind that the appropriations which have been proposed have not yet been acted upon by the Congress. Some of them have been cleared by the Bureau of the Budget; others have not. Therefore, the sums I mention are tentative.[2]

For support of the basic cooperative public health program, we

[1] Presented to the Forty-first Annual Conference of the United States Public Health Service with the State and Territorial Health Officers, Washington, D. C., March 24, 1943.

[2] Subsequent to the time this paper was presented the Congress approved all of the items mentioned except that for "medical and dental care."

expect to have appropriated the full amount authorized by title VI of the Social Security Act, namely, $11,000,000.

The regular venereal disease control appropriation is expected to be $12,367,000—approximately the same as for the current year.

Under the item "Prevention of the Spread of Epidemic Diseases," $311,000 has been requested. Of this, $145,280 is for plague control, $125,720 for typhus fever control, and $40,000 for contingencies which may arise.

The estimates for emergency health and sanitation activities which have already been approved by the Bureau of the Budget amount to approximately $9,700,000. In addition, we expect to submit a request for a little more than one-quarter of a million dollars for medical and dental care. Thus, there may be available for the various emergency health and sanitation activities the following amounts:

General purposes (assistance to States and localities)	$2, 369, 690
Malaria control in war areas	6, 399, 314
Aedes aegypti control	250, 000
Industrial hygiene	546, 310
Facilities security program	110, 000
Medical and dental care	283, 207

The last item, $283,207, represents an initial request for funds to defray certain expenses incidental to providing physicians or dentists for those communities where there is a serious shortage of medical or dental care and for which physicians and dentists cannot be obtained through the relocation procedure used by the Procurement and Assignment Service. Under the proposed plan, the relocation of physicians and dentists would be facilitated by various forms of financial assistance ranging from payment of moving expenses to provision of full salaries and expenses necessary for the operation of a medical service. The modest sum of $283,207 is based upon requests from specific communities where need has been definitely established. In these communities, the Procurement and Assignment Service, the Public Health Service, the State health authorities, and the State medical and dental societies have conducted joint surveys and have agreed that a need exists for additional professional personnel who cannot be obtained without such financial assistance. Surveys are being made constantly in other communities, and, as additional needs are disclosed, requests for more funds will be submitted. It is therefore impossible to indicate what the ultimate cost of this program may be. It is likewise impossible to predict the extent to which Congress will be willing to go in providing services of this kind.

Thus, the Public Health Service budgets already submitted, or about to be submitted, will, if acted upon favorably, make available for cooperative work with the States a total of $33,636,521. While this is

less than the estimates originally submitted to the Bureau of the Budget, it is $525,241 more than the amount available for the current year. Incidentally, I might add that it is almost half again as much as the amount appropriated by all State legislatures to State health departments for use during the current fiscal year, exclusive of institutional funds and fees.

I repeat, therefore, that the financial outlook is fairly good as far as Federal grants are concerned. I feel impelled to say quite frankly, however, that we might reasonably expect more generous State and local appropriations than in the past. Wide publicity has been given to surpluses accumulating in State treasuries, and several States are preparing to reduce their tax rates or to invest surplus funds to serve as a cushion against the shock of post-war readjustment. The general prosperity brought about by war activity should result in larger State and local appropriations for public services, including health work.

While funds may not be lacking, skilled workers are. And a simple exercise in arithmetic, based on widely publicized figures, will show that the personnel situation is destined to grow progressively worse.

In the age group between 18 and 38 there are approximately 22,000,000 males. Only 60 percent of these, or about 13,000,000, are physically up to the standard now required for military duty. Statutory deferments now in effect, together with others under consideration, may result in automatic deferment of as many as 1,500,000, leaving only about 11,500,000 available for service. If we are to have a military force of 11,000,000 at the end of this year, which now seems likely, we shall have to replace battle casualties, other casualties, and men who prove unsuitable for service after induction. Some believe such replacements will require an additional half million men this year. Thus, 11,500,000 men will be needed and 11,500,000 will be available. Of course, these are rough calculations, and they do not take into account the physically acceptable young men who will become of military age during the year. Nevertheless, except in unusual cases, health departments cannot expect continued deferments for personnel within the age group now drawn upon for military service. Practically the only employees they can hope to retain throughout the war are women, and men who are either overage or physically disqualified.

Contrary to the impression sometimes given, health departments have not suffered disproportionately high losses of personnel to the armed services. For example, whereas more than 40 percent of all physicians under 45 are now in the armed forces, only 16.4 percent of health department physicians, in the same age group, are now in the military service. While the two groups may not be exactly comparable from the standpoint of specialized training or essentiality in their respective civilian occupations, one may assume that the

proportions of those in military service among the two groups will tend to become more nearly equal as the war progresses.

Engineers must also be provided in larger numbers than heretofore. At present there are 450 sanitary engineers in the Sanitary Corps of the Army or in the Navy. Since the quota for 1943 calls for a total force of approximately 1,300, an additional 850 will have to be made available. State and local health departments constitute the main reservoir of trained sanitary engineers.

Yet, hardly a day passes when the Public Health Service is not requested to intercede in order to obtain deferment for some individual or group employed by a health agency. One of the most insistent appeals recently received was on behalf of grave diggers. From the figures I have cited, it is evident that these appeals can have little effect. It is true that practically all categories of public health personnel are in deferable classes, but draft boards cannot exercise much discretion because of the necessity of meeting their quotas from a rapidly diminishing list of eligible men.

Now, what are we going to do about it?

An extreme position was expressed recently by one health officer who said he would rather have nobody to do the work than use the kind of people now available. While he was most emphatic in his statement, I doubt if he fully realized its significance. His implication was that health services can be performed only under the most favorable circumstances, and that adjustment to wartime conditions is impossible. I wonder where the Army would be today—or whether we would have an Army at all—if our military leaders took a similar point of view, insisting that an officer could not be produced without 4 years of training at West Point.

Fortunately, such an attitude is not universal. Recently two States—North Carolina and West Virginia—have met the personnel problem in a forthright manner by instituting short, intensive training programs for such workers as they could find. Certain other States and some cities have recruited and trained auxiliary workers, but I believe that only in North Carolina and West Virginia has the task been approached on a State-wide basis and in an organized manner. In my opinion other States will have to do the same if we are to preserve essential civilian health organization during the war.

It would be wrong to give the impression that military need has been the only factor responsible for depletion of health personnel, or that the only solution is recruitment and training of lower-grade workers. Many health department employees have resigned to take more lucrative jobs, and low salary scales have seriously interfered with recruiting efforts.

True, health department salaries have increased somewhat in the

last 3 years. For example, an average of the median salaries paid to county health workers in 8 representative States shows that the following increases have been effected during the past 3 years:

	Average median salary 1940	1943	Increase	Percentage increase
Health officers	$3, 553	$3, 915	$362	10. 2
Nurses	1, 568	1, 675	107	6. 8
Sanitarians	1, 731	1, 863	132	7. 6
All groups				8. 8

These increases have not been great enough to attract the right types of new employees in sufficient numbers, or to keep old employees from leaving. According to the Bureau of Labor Statistics, the cost of living has risen more than 20 percent since the outbreak of the war in Europe in September 1939. Even the so-called "Little Steel Formula," which has served as a basis for general pay adjustments and which is now being severely criticized as inadequate, provides for an increase of 15 percent over pay levels prevailing on January 1, 1941. The Federal Government has recently granted most of its employees an increase of 21.6 percent as compensation for longer hours.

One way of meeting a shortage is to distribute existing resources more thinly. In the past we have emphasized the county as the unit of local health organization and have advocated rather rigid ratios of professional personnel to population served. I seriously doubt if, under present circumstances, we are justified in adhering to these standards. Instead, the services of highly skilled supervisory workers will have to be spread over several counties or other local political subdivisions. In order to accomplish this it will undoubtedly be necessary to place many of the technical personnel on the State pay rolls. Most subordinate positions can then be filled by such personnel as are available locally, but duties must be adjusted to their capabilities.

More thought must also be given to alteration of program content. This topic has been the subject of protracted discussion during the last few years, but always the conclusion is that everything the health department does is essential and must be continued. It is time that we took a more realistic attitude. All activities are not equally necessary, and all of them cannot be continued. For example, what is the purpose of continuing year after year to examine school children when, even in normal times, few of the defects discovered are corrected? Now there is less hope than before of correcting the defects found. Furthermore, granting that defects can be corrected, are we justified in using physicians' time for this purpose when there are not enough physicians to take care of those who are acutely ill? In view of the meager results achieved in the past by this activity, I

believe it is one which can be curtailed for the duration of the war, or at least until a complementary corrective program has been instituted.

A great deal of time is now spent—and I believe wasted—in physical examination of food handlers. Another example of work which would seem to be superfluous under present conditions is resort sanitation. I mention this rather minor item because recently I have heard health officers strenuously defend it despite the fact that pleasure driving is discouraged and most resorts are deserted.

In some places the entire health program might be curtailed in order to concentrate attention on other communities with problems of a more pressing nature. Such curtailment would be appropriate in some well-organized regions where population has diminished or remained static—where the war has had a negative rather than a positive effect. I do not mean that rural regions or county seats off the beaten path of war activity do not need health services, but some of them probably could get along for a time with less service than they are now getting. I dislike to suggest such a course, but we may be warranted in reducing the margins of safety formerly considered essential in good public health practice.

This brings up the question of what constitutes a critical area. So far in this emergency we have considered centers of military or industrial activity to be of primary importance, and relatively little attention has been given to farming regions. With food production assuming ever greater importance, programs may have to be reoriented to give more adequate service to regions where vital foods are raised. Certainly this will be the case if a large corps of itinerant workers is to be recruited by the Federal Government and put to work on food crops. Again, a transfer of existing staffs from the low to the high pressure areas may be part of the solution.

By outlining the personnel situation in such gloomy terms, I do not wish to imply that the main function of health departments today is to furnish the Army and Navy with physicians, nurses, engineers, and technicians. A few health officers have apparently acted on this assumption; they have joined the armed forces themselves and have indiscriminately encouraged their staffs to do likewise. To adopt such an attitude is no more defensible than to insist that every employee must be retained in his present job. Between these two extremes there is a middle path which must be taken. Ultimately, health organizations will be judged by the effectiveness with which civilian health is protected. The war requires that some of the personnel normally utilized for this task be released for military service. Their places should not be left vacant, but should be filled with such personnel as are available. Compensation for the resulting dilution can be effected through in-service training and better organization. The acceptance of added responsibilities may necessitate the

curtailment of activities which are less urgent. Health agencies must maintain a mobile force to meet emergencies and compensate for specific deficiencies in local organizations. Only by making such adjustments can they discharge their responsibilities to their respective communities and to the Nation as a whole.

OPPORTUNITIES IN THE NEWER METHODS OF TUBERCULOSIS CASE FINDING [1]

By Herman E. Hilleboe, *Passed Assistant Surgeon in charge, Tuberculosis Control Section, States Relations Division, United States Public Health Service*

The task of searching out new recruits in the vast army of those with symptomless tuberculosis can be accomplished quickly and certainly only by universal mass radiography. Yet, standard X-ray procedure with 14″ x 17″ films, now unanimously considered the most accurate method for the diagnosis of early pulmonary tuberculosis, is too costly for use on a large scale. A cheaper and more widely applicable technique has long been needed and has finally been provided through the use of small (35 mm., 46 mm., and 4″ x 5″) films.

Extensive use of the small-film technique by the Army, Navy, and Coast Guard has at last enabled X-ray examination to assume the role it deserves as a weapon in the fight against tuberculosis. Now the work must be extended on a grand scale among war workers and their families.

Tuberculosis strikes down the very individuals who are most valuable as war workers—men and women between the ages of 20 and 45. Nearly one-half (47 percent) of all deaths from tuberculosis in this country during the period 1939–41 occurred among this age group. When workers are attacked by tuberculosis—and 1 percent of our industrial manpower is attacked—they perform their jobs inefficiently, increase absenteeism, and unwittingly spread sickness to others.

The last world conflict sent tuberculosis rates soaring in the nations of Europe, and brought about a slight rise even in this country. Today, alarming increases are again being noted throughout Europe, and no one can predict how extensive the damage will be.

In England, during the first months of the war, 10,000 of the 30,000 beds for the tuberculous were taken over by the Emergency Medical Service, and hundreds of infectious and sick persons were sent home. In March 1942, the Emergency Medical Service again made available 7,000 of these beds, but many of them could not be used because of the shortage of nurses and other hospital personnel. Other unfavorable

[1] Presented to the Forty-first Annual Conference of the United States Public Health Service with the State and Territorial Health Officers, Washington, D. C., March 24, 1943.

circumstances, such as overcrowding, overwork, and concentration of workers and their families in newly developed communities, became increasingly manifest. In the short period from 1938 to 1941, the annual number of deaths from all forms of tuberculosis increased 13 percent. Deaths from respiratory tuberculosis increased 10 percent, and those from nonrespiratory tuberculosis, 21 percent. This represents more than 3,000 additional deaths each year from a preventable disease. Deaths from respiratory tuberculosis increased immediately after the outbreak of the war and deaths from other forms, especially tuberculous meningitis among children, began to increase in 1940.

This, then, is what we hope to prevent in this country. There is still time to forestall a similar rise in tuberculosis mortality here. Although there has been no apparent increase in the amount of tuberculosis in the country as a whole, recent figures from individual States are not reassuring. It may be significant that in its analysis of a 10-percent sample of death certificates filed from August to November 1942, the Bureau of the Census states: "Tuberculosis forms a higher proportion of the deaths from all causes in both urban and rural 'critical areas' than in urban and rural 'noncritical areas.'" In these "critical areas" the unfavorable objective circumstances of overcrowding, insanitary living conditions, and unusual fatigue are strikingly apparent. Tuberculosis control efforts should therefore be concentrated on these areas as promptly as possible.

The specific measures required are set forth in the objectives of the Tuberculosis Control Section, recently established in the States Relations Division of the Public Health Service:

1. Mass chest X-ray examination of workers in war industries and of families in war-industry communities, in cooperation with State and local health departments.

2. Development of workable procedures, in cooperation with the Selective Service System, by which cases of tuberculosis discovered among rejected recruits will be reported promptly to health departments for clinical study, care, and treatment.

3. Technical assistance in the establishment and preliminary maintenance of simple and efficient record systems suitable for follow-up activities. This is essential if newly discovered cases among industrial workers and rejected recruits are to be given care and treatment within the limits of local resources.

4. Encouragement and assistance in the establishment of routine X-ray examinations in the admitting rooms of general and mental disease hospitals. Such examinations would constitute an auxiliary, yet effective, method of tuberculosis control in large communities, where death rates from tuberculosis are especially high.

5. Extension of the Army and Navy X-ray case-finding program to all members of the Coast Guard and Merchant Marine.

6. Rapid inventory of existing control programs at the request of State and municipal health departments. This should be followed by reorganization of the programs on a wartime basis, within practicable limits of available personnel and facilities.

At the present time, the Public Health Service has eight 35 mm. X-ray units on loan to State and city health departments for operation in war industries, and two 4" x 5" units for special projects.

In assigning the units, preference is given to requests for service to shipyards, ordnance plants, air depots, and other essential war industries where workers can be examined on a mass basis. Valuable time is wasted if units must be set up and dismantled at one small plant after another.

The small-film units are loaned to health departments for limited periods, primarily to demonstrate the need for such services, to train local personnel, and to help local communities establish their own mass case-finding surveys as soon as they can procure equipment and personnel.

Each photofluorographic unit consists of a medical officer trained in interpreting 35-mm. films, an X-ray technician, a record clerk, and complete equipment for exposing and processing several hundred small films per day. All that must be furnished locally is space, electricity, water, and an uninterrupted succession of workers ready to have their chests X-rayed.

Thirty-five-millimeter photofluorograms are used by the Public Health Service in its industrial and Coast Guard tuberculosis-control programs because they provide a satisfactory method of quickly and economically finding the great majority of significant cases of pulmonary tuberculosis among large groups of examinees. Our experience with this type of equipment has demonstrated that less than 10 percent of cases with minimal lesions are overlooked. Advanced lesions are detected as accurately as with regular-size films.

From an epidemiological or public health point of view, missing 10 percent of minimal lesions is not serious. About one-third of so-called minimal cases detected by X-ray examination are found to be inactive when studied clinically. An additional one-third are dubiously tuberculous on the basis of clinical findings and warrant only an indeterminate diagnosis. Thus only one-third of all minimal lesions are clinically significant. When limited funds are available, it is of greater value to examine 100,000 persons with small films and miss a few minimal cases than to examine one-tenth that number, at the same cost, with the more expensive 14" x 17" celluloid films, and leave 90,000 persons without benefit of any X-ray examination whatever.

Sound public health practice demands that the method used be one which benefits the largest number of individuals in the community. Until funds are available to permit use of a practically unlimited quan-

tity of high-grade 14″ x 17″ celluloid films, the small films will serve very well. Money, however, is not the only thing lacking; in mass survey work, the time of skilled personnel is also important. Through the use of 35-mm. film, one unit can easily expose, process, and interpret 500 films in an 8-hour day. This is fully twice the number of large films that could be handled by the same group in 1 day.

In less than 1 year, the 8 units operated by the Tuberculosis Control Section have surveyed 77 war industries located in 11 States. A total of 194,986 individuals have been X-rayed. Tabulations made of 125,190 examination records have revealed 1,631 individuals with significant pulmonary tuberculosis. This constitutes 1.3 percent of the persons examined. Of the 1,631 cases, 874, or 53.6 percent, were minimal; 707, or 43.3 percent, were moderately advanced; and 50, or 3.1 percent, were far advanced. This distribution is of great interest in view of the fact that, at present, minimal cases comprise only from 10 to 15 percent of the usual tuberculosis case loads in most communities.

Positive cases discovered in the surveys are reported immediately to the family physician or the local health department for clinical study, determination of activity, and appropriate supervision or treatment.

Some interesting results have been obtained in individual surveys conducted so far. Among a group of only 1,050 men and women workers in one small ordnance plant were found 6 cases of previously unknown minimal tuberculosis; 3 cases of moderately advanced disease, 2 of which had cavities; and 1 far advanced case. This indicates that in the fight to conserve industrial manpower tuberculosis is a silent enemy worthy of consideration. Unless steps are taken to retard it, the disease may spread insidiously from the 1 percent of workers who harbor it to healthy fellow workers in the factories, and to unsuspecting families at home.

At the request of the health department and numerous Federal agencies, one small-film unit is being used in Washington, D. C., to make chest X-ray films of Government employees. In the first survey of 5,400 workers in one agency, 66 cases of reinfection tuberculosis were discovered by X-ray examination, including 42 minimal, 22 moderately advanced, and 2 far advanced cases. It is hoped that during the coming year additional units will be provided to enable the Public Health Service to examine large numbers of Government employees.

Another survey of 5,000 Latin Americans in one of the principal war areas in the South revealed 207 persons, or 4.1 percent, with significant pulmonary tuberculosis. This alarming disclosure already has resulted in facilities being provided for care of at least some of these people.

Other conditions besides tuberculosis are frequently discovered by means of the small films. In the survey just mentioned, a massive symptomless tumor of the mediastinum was found in one woman. She was referred to a specialist for differential diagnosis, with the result that a thoracic surgeon removed a dermoid cyst about the size of a baby's head from her chest. Recovery was uneventful. This was only one of several operable intrathoracic tumors discovered.

The ninety-fifth Coast Guard recruit examined by the small-film unit in Baltimore, Maryland, had been in training for several weeks and was ready to board a vessel for prolonged duty at sea. The X-ray film of his chest, however, revealed moderately advanced tuberculosis with cavitation. Consequently, he was sent to a marine hospital for care and treatment. Had he gone to sea, he might have infected his shipmates in the crowded quarters of the vessel, and the disease would probably not have been discovered until irreparable damage had been done. This case serves to illustrate the wisdom shown by our military leaders in adopting chest X-ray examinations for all men going into the service.

Recently, the Public Health Service received an urgent request to send one of its X-ray units to Mexico City to examine Mexican workers who were to be brought into the United States to help harvest the vital fruit crop in California. Accordingly, the unit operating in San Antonio, Texas, quickly disassembled its equipment, loaded everything into a station wagon, and set out for Mexico City. Twenty-four hours after its arrival it was examining the workers and eliminating those with tuberculosis. In this way many individuals were prevented from bringing the disease unknowingly into this country and spreading it to those with whom they might come in contact.

Early discovery of tuberculosis, however, is only the beginning of the work. After the disease is found, adequate follow-up services must be provided. Such services include medical supervision of persons with minimal or arrested tuberculosis who can remain on the job, sanatorium care for those with active and infectious tuberculosis, and rehabilitation services.

Consider what the new case-finding activities mean in terms of wartime tuberculosis control and ultimate eradication of the white plague. From 14 to 17 million persons aged 20 or more, or nearly 1 out of every 5 adults in the United States, will have been X-rayed by the armed forces or by State and Federal health agencies by the end of this year.

Therefore, the case load of known tuberculosis in every State probably will soon be doubled or tripled. If it were possible to furnish each patient with all the services successfully employed in the control of this disease, and thus prevent him from spreading sickness to others, the battle against tuberculosis would be practically won. Unfortu-

nately, no State has the facilities and personnel to do a complete job. Even with limited resources, however, lasting accomplishments can be achieved.

The Public Health Service has realized from the start of its tuberculosis control program the importance of follow-up work. It has cooperated with Selective Service headquarters since early in 1942 to establish procedures whereby State health departments can receive films or reports of rejectees with tuberculosis. You may recall that in March 1942 it was reported that 21 of the 48 States had either no reporting procedures or poor ones. The picture is much brighter in March 1943. The health officers of all the States have recently been asked a few simple questions on this subject. Health officers in 47 of the 48 States and the District of Columbia receive at least the names and addresses of rejectees. However, only 24 of the States receive all the films and 4 others receive some of the films. The great majority of the States receive the films and addresses directly from the State Selective Service headquarters. Nearly all the States which do not receive films would like to receive them.

The picture, however, is not so bright with respect to follow-up work. Only 25 of the 48 States and the District of Columbia stated that follow-up of the tuberculosis cases is complete. In 21 States only partial follow-up is undertaken and in 2 none at all. The predominant reason given is lack of medical and nursing personnel. Eleven of the States requested additional personnel. Other recommendations made by the State health officers included the following: To have State department of health physicians assigned to Selective Service headquarters; to report the name of the family physician; establishment of a tuberculosis control division in the health department; study of rejectees who enter industry; assistance in establishment of procedures of reporting from local to State health departments on results of follow-up of rejectees.

The Selective Service System, the offices of the Surgeons General of the Army and Navy, and the Public Health Service are working together constantly to improve reporting and follow-up procedures. Much work remains to be done in actually getting clinical studies made of all reported rejectees.

In the States where our X-ray units are in operation, all newly-discovered cases are reported to State and local health departments as required by law. This is the first step in the follow-up procedure. The Public Health Service is now organizing a staff to assist States and large cities in developing adequate follow-up systems. The amount of such assistance that will be available depends on the funds which Congress allots for this purpose. With sufficient funds, the Public Health Service would be able to honor requests from State health departments for medical and nursing assistance in establishing follow-

up programs. If the Service does not obtain sufficient funds to permit this, it will at least be able to furnish upon request expert consultants to help in organizing follow-up systems adapted to the facilities available in the various States. Among the consultants will be medical analysts, specially trained in the use of medical records and follow-up systems.

In cooperation with the Division of Industrial Hygiene of the National Institute of Health, the Tuberculosis Control Section is urging medical departments of large industrial plants in which X-ray surveys have been made to follow up new cases found, particularly persons with arrested disease who can remain on the job under medical supervision at the plant.

X-ray examination of newly-admitted and resident patients of mental hospitals is an effective auxiliary method of tuberculosis control in any large community. Employees who work in these institutions are exposed to massive infection from tuberculosis patients, often become diseased themselves, then unwittingly spread the disease to fellow workers in the communities in which they live. Patients out on visits to the homes of friends and relatives spread the disease to unsuspecting healthy members of the community. A recent study of Minnesota State mental hospitals revealed the presence of 1,199 persons with reinfection tuberculosis among 13,300 patients. It is no wonder that 16 percent of the tuberculosis deaths in Minnesota in that year occurred in these State hospitals for the mentally ill.

As already stated, one of the significant results of these extensive case-finding surveys has been a reversal of the respective proportions of early and advanced cases discovered. Whereas current tuberculosis case loads of health agencies normally include only 10 to 15 percent of minimal cases, such cases make up more than 50 percent of those found by industrial X-ray surveys. This fact calls for radical changes in diagnostic and other control procedures. A study is now being made of the implications of this change with respect to the work of health departments, sanatoria, and clinics.

The Tuberculosis Control Section collaborates closely with the Division of Public Health Methods of the National Institute of Health in all research activities. Some of the material collected as part of the service program of the Tuberculosis Control Section will be used for studies of administrative practices. Closer correlation of research and service should shorten the time lag between the acquisition and application of knowledge.

Plans for the coming year include expansion of the present program and extension of special services. Orders have just been placed for 10 additional small-film units. Most of the units will be loaned to the States with a medical officer only. The States will be required

to furnish technicians, clerks, supplies, and transportation facilities as their part of the cooperative program.

With 20 units in full operation during 1943, it is hoped that over 2 million chest X-ray examinations will be made by the Public Health Service in cooperation with State and city health departments. The Public Health Service now has a backlog of requests for X-ray examination of more than 1 million war workers. It is suggested, therefore, that requests for assistance be made as soon as possible.

If your health department is still concentrating solely on tuberculin testing of school children, limiting your work chiefly to public health education, and finding only advanced, hopeless cases, your program needs to be revamped and placed on a war footing. It should be streamlined for immediate action and stripped of all nonessentials. At this time, the Public Health Service cannot provide States with funds to build new sanatoria or to maintain old ones, but it can give the States expert assistance in making better use of the facilities at their disposal. The Service is ready and willing to loan field X-ray units and to provide some professional personnel to help States and cities get started on a wartime program of tuberculosis case finding and follow-up. It will also provide expert medical analysts to assist in establishing tuberculosis record systems suitable for effective follow-up and control.

Our principal task now, as recently stated by Surgeon General Parran, is to extend tuberculosis control activities so as to reach the greatest number of essential workers and their families in the shortest possible time, making full use of all governmental and voluntary resources. With energetic and concerted action by all agencies involved, the expected wartime rise in tuberculosis can be prevented, and the final eradication of tuberculosis from the United States will be achieved that much sooner.

ABSTRACTS OF COMMITTEE REPORTS ADOPTED BY THE FORTY-FIRST ANNUAL CONFERENCE OF THE UNITED STATES PUBLIC HEALTH SERVICE WITH THE STATE AND TERRITORIAL HEALTH OFFICERS

Following are abstracts of the reports of the various committees which were presented to the Forty-first Annual Conference of the United States Public Health Service with the State and Territorial Health Officers[1] and which were adopted by the Conference:

COMMITTEE ON HEALTH PROGRAMS

Since the beginning of the present national emergency deficiencies in the physical fitness of our young men and women have constituted an

[1] Held in Washington, D. C., March 24-25. 1943.

outstanding and discouraging problem. To improve this situation the Committee recommends a carefully planned, long-range program to provide wholesome physical environment, adequate nutrition, medical and dental care, control of communicable diseases, elimination of hereditary defects, sound mental hygiene, and effective industrial health procedures.

Because of the shortage of trained public health personnel the Committee recommends that each health officer establish the essentiality of key members of his staff as well as of essential physicians in his jurisdiction, recruit and train professional and subprofessional personnel, rearrange health jurisdictions to improve efficiency and equalize the distribution of services, eliminate services which are merely traditional, and distribute personnel as advantageously as possible in critical areas.

The Committee congratulates the Surgeon General of the Public Health Service on his participation in the Procurement and Assignment Service's program to solve the shortage of physicians and dentists—a problem which the Committee fears will become increasingly acute. State health officers are urged, if and when this program is activated by a Congressional appropriation, to submit requests to the Surgeon General for physicians and dentists to be assigned to needy areas.

The Committee recommends that home nursing services established by many State and local health departments because of inadequate hospital facilities be handled as a part of the regular public health nursing programs in the interest of economy.

The Committee urges that most serious thought be given the announced intention of the armed forces to take every physically fit graduate of our medical schools. This would leave available for the civilian population only one-fourth of the number necessary to replace practicing physicians who die or become incapacitated.

The Committee urges an immediate survey of existing medical facilities, supplies, and equipment available for the civilian population to determine their adequacy. Mindful of the necessary redistribution of population following the war, the Committee recommends that each State begin a study to determine the needs for (*a*) medical, dental, nursing, and other professional personnel, and (*b*) facilities, including additions to existing hospitals, health centers, clinics, and offices necessary for the utilization of physicians' services.

The Committee suggests that an agreement be reached by the American Medical Association, the Public Health Service, the Children's Bureau, and the State medical and public health organizations on principles and procedures governing distribution of physicians, both now and after the war. It believes such a meeting of minds can be realized through the Procurement and Assignment Service and the

Health and Medical Committee serving in an advisory capacity to the Administrator of the Federal Security Agency.

The Committee believes that suggestions for the regimentation or socialization of medicine are impracticable and Utopian. Freedom of people to choose their physicians must be safeguarded.

The Committee believes the relocation of physicians within a governmental unit is, first, the responsibility of the community concerned, under the leadership of the county medical society and health officer. When they cannot solve the problem it should be referred to the State medical association, the State Procurement and Assignment Service, and the State health department for joint action. Upon the inability of these groups to provide jointly for the necessary relocation, Federal assistance should be sought through the Public Health Service.

The Committee emphasizes the importance of an intensive tuberculosis control program, approves continuance of the present plan of isolation of infectious cases, and recommends that hospitals for the care of early cases be provided where necessary.

The Committee recommends intensive health education programs at the local level, immediate employment of personnel skilled in educational techniques, training of possible leaders in this field, provision of funds to purchase educational materials, and integration of health education with the whole public education system.

The Committee regards the development of a national nutrition program as of paramount importance. It deplores the present confusing duplication of effort in this field among Federal agencies. One agency, preferably the Department of Agriculture with its county unit organization plan, should be responsible for developing the program.

* * *

The Committee made a number of specific recommendations with regard to the development of comprehensive industrial hygiene programs by the States, the planning of community environmental sanitation programs which would involve post-war construction of public works, and the development of better mental hygiene facilities and services.

COMMITTEE ON FEDERAL-STATE RELATIONS AND ALLOCATION OF FEDERAL FUNDS

This Committee, after meeting with consultants designated by the Surgeon General, offers the following recommendations:

That the appropriation for emergency health and sanitation activities be increased from 2 million to 4 million dollars. The present sum is insufficient in view of the needs. Altogether some 800 persons have been employed under this program; of these 500 still are on duty. It is believed 600 more could be recruited, trained, and utilized if funds were available.

That a small committee of the association meet with the Surgeon General to explore the possibility of commissioning State health department personnel in the Public Health Service and reassigning them to the States from which they came.

That the present system of Public Health Service district offices and district directors be continued.

That the Public Health Service approve not only the construction details of hospitals financed entirely by Federal funds but that it extend this service to hospitals financed partly by Federal and partly by local funds.

In order that there might be eventual uniformity among such State laws as those governing communicable disease control and premarital examinations, the Committee requests the Public Health Service to assemble the laws and regulations of the States and Territories preliminary to a critical appraisal of their value and suitability as measures for the protection and promotion of public health.

The Committee reports widespread sentiment in favor of expansion of the health program of the Social Security Act and an increase in the funds appropriated under title VI. It believes that Congress should be made aware of the fact that every appropriation for a specific purpose demands a competent, underlying staff of specialized personnel to make it effective; that allocations made on the basis of estimated needs are of necessity more rigidly fixed than is desirable and cannot be changed easily to meet the exigencies in a particular fiscal year; and that, despite unexpended balances on hand at the end of each fiscal year, the amount authorized is still inadequate.

* * *

A motion was made and carried expressing appreciation to the Public Health Service for the emergency health and sanitation personnel which the Service has trained and made available to the States.

COMMITTEE ON BUSINESS MANAGEMENT

This is a report of the Joint Committee on Business Management of the Surgeon General's Conference with State and Territorial Health Officers and the Association of State and Territorial Health Officers. The Committee considered and disposed of all items coming to its attention, and makes the following specific recommendations:

That in the future the Executive Committee of the Association and representatives of the Surgeon General's Conference with State and Territorial Health Officers clearly define the items to be considered by the various joint committees in order to avoid questions of jurisdiction.

That inasmuch as certain States have recommended establishment of a plan or method of allocation of funds within the States and the Committee feels that it cannot assume responsibility for such a plan, it recommends that each State set up its own criteria for the allocation of funds within its own jurisdiction, and that this Committee procure and make available to all State health officers the general allocation plans, including code references of enabling legislation, now in effect in all States.

That unremitting effort be made to simplify budgets, budget amendments, budget

forms, accounting procedures, and financial and activities reports. The Committee strongly urges the immediate appointment by the Chair of a subcommittee of five accounting consultants from State health department staffs to serve as an advisory group to this Committee on budgetary and related matters.

That the Surgeon General of the Public Health Service and the Director of the Children's Bureau arrange joint regional meetings throughout the country at which representatives of their respective agencies may meet with members of State health department staffs to discuss fiscal procedures and cooperative programs.

That the joint budget forms previously recommended by this Committee, now being tried out on a voluntary basis in five States, be continued on such a basis unless there is specific objection from a particular State. In order to clear up any misunderstanding regarding the use of these joint budgets, the Committee adds that they were recommended by the Committee and are not used as a result of a request by either the Public Health Service or the Children's Bureau.

That no major, and few minor, changes be attempted in fiscal or activities reporting policies (including special or new activities reporting) unless they effect savings in clerical and related work or contribute to the public welfare.

COMMITTEE ON PERSONNEL

The dwindling supply of available sanitary engineers is a serious problem. Studies are being made to find available reserves. The Procurement and Assignment Service is setting up a program for relocation of engineers. Because State health departments will have to get along with fewer sanitary engineers, the Committee recommends eliminating for the duration of the war all services that can be suspended. One State considers stream pollution surveys in this category. The Committee recommends immediate training of men over 38 years of age to replace those inducted into the armed services.

The Committee considered the suggestion of the consultants to establish emergency personnel classifications for the duration of the war; however, the Committee recommends emergency appointments.

The Committee feels there is need for closer collaboration and agreement between the Public Health Service and the Children's Bureau in setting up classifications.

The Committee concurs in the recommendation by the Public Health Service that its training policies be amended to provide that "maximum monthly stipends at a rate of $100 per month will be approved for individuals whose annual salaries are $1,600 or less before this training begins. For individuals with annual salaries or professional fee incomes of more than $1,600 annually, stipends at a rate equal to 75 percent of the monthly salaries or income before training will be approved up to a maximum of $200 per month, except that the 75-percent limitation shall not apply where State civil service or budgetary regulations provide otherwise for pre-stipend training salaries."

It also approves the amendment to section IV of the training policies creating subsection D to be entitled "Subsistence during short periods of training" which follows:

When a trainee is required to leave his established headquarters an allowance for per diem in lieu of subsistence, in accordance with State laws and recommendations, shall be allowed for accredited field training and nonaccredited field practice, periods not to exceed 6 weeks.

It also approves the amendment to section I, paragraph 3, permitting the employment of "unskilled workers and laborers including: (*a*) janitors, (*b*) elevator operators, (*c*) similar unskilled groups," without regard to merit system requirements unless prohibited by laws now in existence.

New classifications were submitted by Public Health Service consultants for physicians, sanitary engineers, a chief accounting officer, and a nutrition consultant. It is recommended that copies of the proposed new classifications be submitted to all State health officers for consideration and study before approval.

The Committee recommends that Federal agencies should recognize as satisfactory, for the purpose of compliance with the section of the Social Security Act requiring "such methods of administration as are satisfactory," the personnel and other standards of State civil service or merit systems established by duly constituted State legislative authorities.

COMMITTEE ON INTERSTATE AND FOREIGN QUARANTINE

The Committee on Interstate and Foreign Quarantine submits the following recommendations:

That the Public Health Service prepare suitable rules and regulations for the control of interstate shipment of psittacine birds.

That all health organizations—national, State, and local—take active steps for the control of the *Aedes aegypti* mosquito, in order to minimize the danger of the introduction of yellow fever into the United States.

That State health officers furnish the Public Health Service more specific information concerning the interstate shipment of dressed and undressed rabbits, in order that more adequate laws and regulations may be evolved.

That the Public Health Service revise and bring up to date the present Interstate Quarantine Regulations. A new law clearly defining the lines of Federal authority and action might be desirable.

That the programs for the control of infectious diseases in war areas undertaken by the Public Health Service with the assistance of State and local health authorities be continued with the active participation of State and local agencies.

That the Public Health Service continue its cooperation with the Food and Drug Administration and the Agricultural Marketing Administration with a view to amending the Federal Insecticide Act, in order to avoid recurrences of accidental poisoning such as that which occurred at the Oregon State Hospital for the Insane in November 1942, and that State and Territorial health officers obtain passage of similar legislation in their respective States.

The Committee cites the great emphasis being placed upon improved sanitary conditions on vessels and reports that the Public Health Service has inspected ratproofing work on 3,000 vessels under construction throughout the country. The Maritime Commission requires the Public Health Service certificate of ship ratproofing and sanitary inspection on all vessels it builds.

The Committee calls attention to the expansion of Federal housing programs in military and war industry areas, to the urgent health and sanitation problems thus created for State and local health authorities, and to the new sanitation facilities which will be needed by the new communities. It is recommended that the Public Health Service aid in meeting these problems by establishing closer cooperation between State and local health departments and the Federal housing agencies.

The Committee presents for the information of the Conference the following procedure for surveillance of air travelers:

All persons originating or having traveled in areas where yellow fever may be present are required to present a sanitary certificate of origin to the quarantine officer. This certificate indicates the whereabouts of the traveler for 6 days prior to departure. From this and a personal questioning, the quarantine officer can determine whether or not the person could have been exposed to yellow fever infection. The incubation period is projected 6 days from the time of last possible contact, and the health officer of the locality to which the passenger is bound is notified of the pertinent facts and requested to keep the person under observation until the indicated incubation period has elapsed. A copy of all communications of this type is routinely supplied to the State health officer of the area involved. The request to the local health officer is dispatched by telegram, air mail, or letter as circumstances indicate. The local health officer is requested to telegraph at Government expense, collect, in the event an undiagnosed fever should develop in the traveler.

* * *

Following a discussion of the inadequate protection given drinking water during the actual process of delivery to trains, it was moved that the Public Health Service be urged either to activate present regulations or institute new regulations requiring more adequate protection of the water which is supplied not only to passenger trains but more especially to railroad yards. The motion carried.

COMMITTEE ON VITAL STATISTICS

The Committee recommends the establishment of a Federal bureau vested with authority to receive and coordinate vital records information from State health departments, including vital statistics at present transmitted to the Division of Vital Statistics, Bureau of the Census. The Committee recommends that such activity be administered by the Public Health Service.

COMMITTEE ON VENEREAL DISEASE CONTROL

The Committee approves the adoption of a uniform law requiring premarital examinations for the control of syphilis and endorses in principle the law recommended by the American Social Hygiene Association and published in the Journal of Social Hygiene for November 1938. This law provides that each applicant for a marriage license shall file with the licensing authority a certificate from a duly licensed physician stating that such applicant has been given such examination, including a standard serological test, as may be necessary for the discovery of syphilis, made not more than 30 days prior to the date of such application, and that, in the opinion of the physician, the person therein named either is not infected with syphilis or, if so infected, is not in a stage of that disease which is or may become communicable to the marital partner. The law provides for certain exceptions to this rule in case of emergency, and also for certain safeguards to insure the confidential nature of the laboratory's and physician's statements.

The Committee also approves the "Recommendations to State and Local Health Departments for a Venereal Disease Control Program in Industry" made by the Advisory Committee to the Public Health Service and published in The Journal of the American Medical Association for November 14, 1942. Briefly, these recommendations are:

(1) That plans be discussed with the State-wide agencies concerned, which include: (*a*) State medical committees on venereal disease, industrial health or other appropriate committees, (*b*) associations representing employers, (*c*) organizations representing labor, (*d*) voluntary health and welfare organizations.

(2) Administration of the program should be shared by the venereal disease and industrial hygiene divisions of the State health department.

(3) A consultation service to industry should be provided, including specific recommendations for diagnostic and treatment facilities, education, epidemiologic and case holding services, and free drug service.

(4) That a sound policy be adopted regarding employment of persons infected with venereal disease. When such persons are denied employment or discharged without due regard to what may be achieved through adequate treatment and careful case selection to eliminate those with serious disabling manifestations, the right to earn an income is unjustifiably denied.

(5) That provision be made for conference with venereally infected applicants or employees, for referral to a reputable source of medical treatment, and for follow-up to insure that adequate treatment is received.

PREVALENCE OF POLIOMYELITIS

A sharp increase in the incidence of poliomyelitis in the United States, first noted for the week ended June 5, has continued through the week ended July 10. This increase, and the somewhat high inci-

dence to date, is accounted for largely by the cases reported in four States—Texas, California, Oklahoma, and Arizona—as shown in the following table:

State	Week ended—						
	May 29	June 5	June 12	June 19	June 26	July 3	July 10 [1]
Total cases, United States [3]	34	54	61	109	140	208	243
Texas	6	6	10	29	39	80	90
California [2]	13	35	28	57	62	75	75
Oklahoma	0	0	0	1	8	23	44
Arizona [3]	3	1	3	1	6	3	0

[1] From preliminary weekly telegraphic reports.
[2] Corrected figures based on mail reports from California.
[3] January, 2 cases; February, 2; March, 8; April, 5; May, 14.

Up to the week ended July 3, a total of 396 cases had been reported in California. The largest numbers of cases occurred in Los Angeles County (140), Kern County (37), Alameda County (23), Sacramento County (18), Contra Costa County (17), and Sonoma County (17). To that date, cases had been reported in 36 of the 58 counties of the State.

A total of 240 cases had been reported in Texas up to the week ended July 3. The largest numbers of cases had occurred in Harris County (40), Tarrant County (27), Bexar County (18), Dallas County (17), and Galveston County (16). Cases had been reported in 65 of the 254 counties of the State.

For the first half year, to the week ended July 3, Arizona had reported a total of 45 cases, principally in three adjoining counties—Yuma, Maricopa, and Pinal.

Information regarding the distribution of cases in Oklahoma is not yet available. From January to April, inclusive, only 3 cases were reported in the State, 1 each in Latimer, Marshall, and Wagoner Counties. No further cases were reported in the State until the week ended June 19, when 1 case was reported. For the weeks ended June 26, July 3, and July 10, there were 8, 23, and 44 cases, respectively, reported.

No State other than these four has reported more than 6 cases in any week this year up the the week ended July 10.

For the first half of 1943 a total of 1,084 cases of poliomyelitis was reported, as compared with 609 for the same period in 1942 and a 5-year (1938–42) median of 708. The total number of cases reported for the current half-year is above that reported for the corresponding period of any prior year since 1934, when 2,154 cases were reported.

The number of cases of poliomyelitis reported for the entire year and for the first half year of the past 9 years are as follows:

Year	Total cases reported	Cases reported for first 6 months of year	Peak week	
			Week ended—	Number of cases reported
1934	7,517	2,154	June 23	376
1935	10,839	1,072	Aug. 31	1,088
1936	4,523	514	Oct. 3	290
1937	9,511	807	Sept. 18	879
1938	1,705	543	Aug. 27	94
1939	7,343	749	Sept. 16	501
1940	9,826	788	Sept. 14	797
1941	9,086	695	Aug. 30	620
1942	4,193	609	Sept. 12	276

In 1934 the incidence of poliomyelitis increased sharply in May and reached the peak about the middle of June. Almost one-third of the total cases reported for that year occurred during the first 6 months. A rather high weekly level (approximately 300 cases) was maintained until the latter part of September. In 1935, 1937, and 1941 the initial sharp increase followed more closely the present pattern, while in 1940 it occurred somewhat later.

The following table shows the incidence rates for poliomyelitis, per 100,000 population, by geographic areas, from 1934 to 1942, inclusive:

Poliomyelitis case rates per 100,000 population, 1934–1942

Geographic division	1934	1935	1936	1937	1938	1939	1940	1941 [1]	1942 [1]
New England	1.6	29.1	1.6	8.0	0.8	1.8	1.1	5.0	2.2
Middle Atlantic	1.6	13.5	1.5	4.4	1.0	6.3	1.7	8.3	2.6
East North Central	3.7	4.3	5.0	8.6	1.1	5.4	13.8	5.1	3.6
West North Central	2.6	1.9	2.5	10.9	1.1	6.7	17.2	3.5	3.9
South Atlantic	2.1	10.0	2.5	2.9	1.6	5.1	6.1	10.8	2.1
East South Central	2.6	4.7	9.8	6.4	2.3	2.7	3.5	16.9	4.1
West South Central	1.7	1.8	2.2	12.2	1.3	2.7	3.4	2.8	3.7
Mountain	17.6	1.7	3.8	9.3	1.5	11.6	8.0	3.5	4.1
Pacific	46.9	9.6	5.3	8.4	1.6	11.0	9.8	3.9	3.6
United States	5.9	8.4	3.5	7.3	1.3	5.6	7.4	6.9	3.2

[1] Rates for 1941 and 1942 are probably less accurate than those for prior years owing to lack of reliable population estimates.

DEATHS DURING WEEK ENDED JULY 3, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 3, 1943	Corresponding week, 1942
Data for 89 large cities of the United States:		
Total deaths	9,259	7,657
Average for 3 prior years	7,507	
Total deaths, first 26 weeks of year	249,541	225,194
Deaths under 1 year of age	659	539
Average for 3 prior years	471	
Deaths under 1 year of age, first 26 weeks of year	17,175	14,472
Data from industrial insurance companies:		
Policies in force	65,581,183	64,947,038
Number of death claims	12,017	10,896
Death claims per 1,000 policies in force, annual rate	9.6	8.7
Death claims per 1,000 policies, first 26 weeks of year, annual rate	10.3	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 10, 1943

Summary

Poliomyelitis cases reported for the week totaled 245, as compared with 190 for the preceding week and a 5-year median of 71. Of the current total, 209 cases were reported in three States as follows (last week's figures in parentheses): Texas, 90 (80); California, 75 (57); Oklahoma, 44 (23). Only three other States, New York, Illinois, and Kansas, reported as many as five cases each. A more detailed statement regarding poliomyelitis appears on p. 1108.

Meningococcus meningitis cases reported increased from 245 for the preceding week to a total of 267 for the current week. The net increase was accounted for by small increases in several States, the largest being in North Carolina, from 4 to 13, and in California, 16 to 23. No other State reported more than 19 cases except New York, 28. The accumulated total for the first 27 weeks of the year is 12,278, as compared with 2,082 for the same period last year and a 5-year median of 1,241.

Of the nine common communicable diseases included in the following table, only one other disease, typhoid fever, showed increased incidence as compared with the preceding week; all except diphtheria, smallpox, and typhoid fever, however, are above the corresponding medians of the past 5 years.

The accumulated totals to date of the diseases included in the table are as follows (last year's figures in parentheses): Anthrax, 35 (44); diphtheria, 6,264 (6,487); dysentery, all forms, 10,070 (6,473); infectious encephalitis, 306 (223); influenza, 78,250 (78,564); leprosy, 15 (32); measles, 517,735 (455,427), meningococcus meningitis, 12,278 (2,082); poliomyelitis, 1,329 (668); Rocky Mountain spotted fever, 203 (227); scarlet fever, 93,132 (85,119); smallpox, 583 (577); tularemia, 499 (526); typhoid fever, 1,953 (2,593); endemic typhus fever, 1,384 (1,072); whooping cough, 109,691 (102,036).

Deaths registered for the current week in 88 large cities of the United States totaled 7,725, as compared with 9,235 last week and a 3-year (1940–42) average of 7,775. This is the first week this year that these figures have dropped below the 3-year average. The accumulated number for the first 27 weeks of the year is 256,441, as compared with 231,992 for the same period in 1942.

Telegraphic morbidity reports from State health officers for the week ended July 10, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42
	July 10, 1943	July 11, 1942		July 10, 1943	July 11, 1942		July 10, 1943	July 11, 1942		July 10, 1943	July 11, 1942	
NEW ENGLAND												
Maine	0	1	0	------	------	------	23	38	38	4	4	0
New Hampshire	0	0	0	1	------	------	11	15	9	3	0	0
Vermont	0	0	0	------	------	------	91	74	61	0	0	0
Massachusetts	0	8	0	------	------	------	480	365	365	19	5	0
Rhode Island	0	0	0	------	------	------	106	50	50	0	0	0
Connecticut	1	1	1	------	------	1	124	145	145	7	2	0
MIDDLE ATLANTIC												
New York	14	7	10	[1] 1	[1] 1	[1] 1	1,292	605	788	28	10	4
New Jersey	1	1	2	2	1	1	967	285	258	9	3	0
Pennsylvania	7	0	7	------	------	------	226	196	272	18	4	2
EAST NORTH CENTRAL												
Ohio	3	3	6	2	4	5	216	62	82	9	0	1
Indiana	2	2	4	1	10	2	108	22	22	8	0	0
Illinois	10	13	13	5	4	4	548	73	150	14	1	1
Michigan [2]	3	2	1	2	------	------	883	118	230	5	2	1
Wisconsin	2	0	0	7	13	9	942	509	643	2	1	0
WEST NORTH CENTRAL												
Minnesota	4	4	1	------	1	1	131	80	31	1	0	0
Iowa	1	1	1	1	1	------	52	68	101	2	0	0
Missouri	1	5	3	1	------	------	58	38	36	9	2	0
North Dakota	2	8	0	1	1	1	96	7	12	1	0	0
South Dakota	1	2	2	------	1	------	159	10	5	1	0	0
Nebraska	3	1	1	------	2	------	55	37	16	2	0	0
Kansas	4	0	3	4	------	------	67	41	41	0	1	1
SOUTH ATLANTIC												
Delaware	1	0	0	------	------	------	5	1	2	1	2	0
Maryland [2]	0	3	3	3	1	1	85	81	31	7	5	1
District of Columbia	0	2	1	------	------	------	39	11	12	5	0	0
Virginia	3	8	4	32	20	20	102	29	128	15	1	1
West Virginia	8	1	3	------	2	2	8	2	9	4	0	0
North Carolina	2	8	3	19	------	1	41	43	43	13	1	1
South Carolina	1	9	6	160	122	93	88	52	52	9	0	1
Georgia	2	1	9	8	5	5	8	15	15	5	1	0
Florida	2	1	1	9	------	------	18	13	12	5	1	1
EAST SOUTH CENTRAL												
Kentucky	1	3	2	2	------	1	12	11	44	5	0	1
Tennessee	1	4	4	6	16	11	18	9	41	2	8	2
Alabama	2	5	5	12	8	4	80	13	39	1	1	1
Mississippi [2]	6	8	6	------	------	------	------	------	------	2	1	------
WEST SOUTH CENTRAL												
Arkansas	2	5	8	12	1	6	16	21	21	2	1	0
Louisiana	6	4	4	11	1	9	15	24	4	0	1	1
Oklahoma	3	3	3	5	3	10	4	27	17	4	0	0
Texas	16	28	13	295	122	90	118	68	99	7	4	1
MOUNTAIN												
Montana	0	2	1	1	------	------	69	44	31	2	1	0
Idaho	0	0	0	3	------	------	3	56	7	0	0	0
Wyoming	0	0	0	9	36	------	12	21	14	0	1	0
Colorado	5	5	8	11	21	10	32	43	43	0	0	0
New Mexico	0	0	2	------	------	------	1	4	10	1	0	0
Arizona	1	2	0	30	19	19	20	18	18	3	0	0
Utah [2]	0	0	1	------	------	------	70	168	79	2	0	0
Nevada	0	0	------	------	------	------	2	10	------	0	0	------
PACIFIC												
Washington	10	10	8	------	------	------	93	288	63	5	0	0
Oregon	2	1	1	------	1	3	46	52	34	7	0	0
California	10	16	16	13	21	17	366	856	394	23	2	2
Total	138	173	173	669	438	326	7,906	4,763	4,763	267	61	30
27 weeks	6,264	6,487	7,898	78,250	78,564	149,771	517,735	455,427	455,427	12,278	2,082	1,241

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 10, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis, Week ended July 10, 1943	Poliomyelitis, Week ended July 11, 1942	Poliomyelitis, Median 1938-42	Scarlet fever, Week ended July 10, 1943	Scarlet fever, Week ended July 11, 1942	Scarlet fever, Median 1938-42	Smallpox, Week ended July 10, 1943	Smallpox, Week ended July 11, 1942	Smallpox, Median 1938-42	Typhoid and paratyphoid fever, Week ended July 10, 1943	Typhoid and paratyphoid fever, Week ended July 11, 1942	Typhoid and paratyphoid fever, Median 1938-42
NEW ENGLAND												
Maine	0	0	0	2	7	4	0	0	0	1	0	2
New Hampshire	0	0	0	2	5	1	0	0	0	1	0	0
Vermont	0	0	0	5	0	0	0	0	0	0	0	0
Massachusetts	0	2	1	132	69	65	0	0	0	8	6	3
Rhode Island	0	0	0	4	1	4	0	0	0	0	1	0
Connecticut	1	0	0	25	14	14	0	0	0	1	1	0
MIDDLE ATLANTIC												
New York	5	2	2	87	110	140	0	0	0	3	8	5
New Jersey	1	0	0	23	34	34	0	0	0	0	3	2
Pennsylvania	0	1	1	38	74	100	0	0	0	4	6	6
EAST NORTH CENTRAL												
Ohio	3	0	1	74	61	89	0	0	0	14	5	7
Indiana	0	3	1	12	10	12	0	1	1	2	3	3
Illinois	5	2	2	38	57	78	1	3	4	5	2	7
Michigan [2]	0	0	0	34	41	89	0	0	0	3	4	2
Wisconsin	0	0	0	88	47	47	0	0	2	1	1	1
WEST NORTH CENTRAL												
Minnesota	2	0	0	21	21	21	0	0	2	0	5	0
Iowa	1	2	1	19	10	15	0	0	9	0	0	3
Missouri	0	1	0	24	12	12	0	2	2	1	6	6
North Dakota	1	0	0	1	9	4	0	0	0	0	0	0
South Dakota	0	0	0	4	7	4	5	0	4	0	0	0
Nebraska	0	0	0	14	7	7	0	1	0	0	0	0
Kansas	5	0	0	10	16	21	0	1	0	0	1	3
SOUTH ATLANTIC												
Delaware	0	1	0	1	3	2	0	0	0	0	1	0
Maryland [2]	0	0	0	9	18	12	0	0	0	2	2	2
District of Columbia	0	0	0	9	11	5	0	0	0	0	0	0
Virginia	1	0	0	13	10	10	0	0	0	10	4	12
West Virginia	0	1	0	16	12	10	0	0	0	8	6	5
North Carolina	0	1	1	11	6	13	0	0	0	3	4	9
South Carolina	0	0	0	2	3	1	0	0	0	2	6	14
Georgia	0	4	4	11	8	8	0	0	0	11	17	21
Florida	0	2	2	6	2	1	0	0	0	4	8	2
EAST SOUTH CENTRAL												
Kentucky	2	2	2	5	20	12	0	0	0	9	11	13
Tennessee	3	5	0	6	14	14	0	0	0	8	14	14
Alabama	1	4	4	7	5	9	0	0	0	1	8	6
Mississippi [2]	0	1	2	6	1	2	1	0	0	7	6	11
WEST SOUTH CENTRAL												
Arkansas	3	12	0	1	3	2	0	0	0	5	8	8
Louisiana	0	1	0	4	5	4	0	0	0	6	24	15
Oklahoma	44	2	2	7	2	9	0	0	3	3	2	9
Texas	90	2	2	25	9	17	0	1	1	17	37	43
MOUNTAIN												
Montana	0	0	0	3	3	6	0	0	0	0	0	1
Idaho	0	1	0	1	4	1	0	0	0	0	1	0
Wyoming	0	1	0	11	3	2	0	0	0	0	0	0
Colorado	1	0	0	25	6	8	0	0	0	0	0	2
New Mexico	0	1	0	1	2	2	0	0	0	1	0	3
Arizona	0	0	0	3	3	2	0	0	0	2	1	1
Utah [2]	0	0	0	14	5	6	0	0	0	0	1	0
Nevada	1	0	------	------	2	------	0	0	------	0	0	------
PACIFIC												
Washington	0	0	0	10	8	13	0	0	1	0	1	1
Oregon	0	2	0	10	2	5	0	0	0	0	1	1
California	75	3	4	90	44	53	0	0	0	3	0	5
Total	245	59	71	964	826	921	7	9	31	146	215	232
27 weeks	1,329	668	794	93,132	85,119	111,719	583	577	1,794	1,953	2,593	2,861

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 10, 1943 and comparison with corresponding week of 1942 and 5-year median—Continued

Division and State	Whooping cough, Week ended July 10, 1943	Whooping cough, Week ended July 11, 1942	Whooping cough, Median 1938–42	Week ended July 10, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	15	28	24	0	0	0	0	0	0	0	0	0
New Hampshire	0	4	1	0	0	0	0	0	0	0	0	0
Vermont	13	55	16	0	0	0	0	0	0	0	0	0
Massachusetts	53	221	92	0	0	0	0	0	0	0	1	0
Rhode Island	18	24	18	0	0	0	0	0	0	0	0	0
Connecticut	19	61	42	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	247	371	371	0	2	5	0	3	0	2	0	0
New Jersey	160	231	222	0	0	0	0	0	0	1	0	0
Pennsylvania	199	216	238	0	0	0	0	1	0	0	0	0
EAST NORTH CENTRAL												
Ohio	211	184	184	0	0	0	0	0	0	0	0	0
Indiana	79	62	17	0	0	0	0	0	0	1	0	0
Illinois	139	382	229	0	2	0	0	1	0	0	0	0
Michigan [2]	190	167	167	0	0	2	0	0	0	0	0	0
Wisconsin	283	223	185	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	80	41	39	0	5	0	0	0	0	0	0	0
Iowa	58	27	27	0	0	0	0	0	0	0	0	0
Missouri	46	18	17	0	0	0	0	1	0	1	2	0
North Dakota	20	2	13	0	0	0	0	0	0	0	0	0
South Dakota	1	0	4	0	0	0	0	1	0	0	0	0
Nebraska	14	13	13	0	0	0	0	0	0	0	0	0
Kansas	83	69	69	0	0	0	0	1	0	0	1	0
SOUTH ATLANTIC												
Delaware	6	2	4	0	0	0	0	0	0	0	0	0
Maryland [2]	86	45	45	0	0	0	1	0	0	1	0	0
District of Columbia	38	22	9	0	0	0	0	0	0	0	0	0
Virginia	144	57	112	0	0	0	366	0	0	3	0	0
West Virginia	74	15	36	0	0	0	0	0	0	0	0	0
North Carolina	176	86	123	0	0	0	0	0	0	4	0	3
South Carolina	144	65	90	0	0	39	0	0	0	1	0	5
Georgia	39	14	37	0	0	17	2	0	0	0	3	30
Florida	7	18	10	0	7	1	0	0	0	0	0	8
EAST SOUTH CENTRAL												
Kentucky	29	75	56	0	0	2	0	0	0	0	0	0
Tennessee	54	22	62	0	0	0	12	0	0	1	6	0
Alabama	39	51	39	0	0	0	0	0	0	0	0	20
Mississippi [2]				0	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas	46	20	22	0	0	34	0	0	0	0	2	0
Louisiana	22	9	12	0	0	0	0	1	1	0	1	4
Oklahoma	40	12	12	0	0	0	0	0	0	0	0	0
Texas	316	203	234	0	13	436	0	3	0	0	0	28
MOUNTAIN												
Montana	31	17	6	0	0	0	0	0	0	0	1	0
Idaho	2	5	7	0	0	0	0	0	0	0	0	0
Wyoming	0	17	3	0	0	0	0	0	0	2	2	0
Colorado	33	33	33	0	1	2	0	0	0	0	0	0
New Mexico	8	24	24	0	0	2	4	0	0	0	0	0
Arizona	24	6	8	0	0	0	64	0	0	0	0	0
Utah [2]	93	31	55	0	0	0	0	2	0	1	1	0
Nevada	0	2		0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	49	25	25	0	0	0	0	0	0	0	0	0
Oregon	32	30	26	0	1	0	0	0	0	0	0	0
California	216	222	222	9	3	26	0	4	0	0	1	0
Total	3,676	3,522	3,431	0	34	566	449	18	1	18	21	98
27 weeks	109,691	102,036	105,049	35	995	6,910	2,165	306	15	203	499	1,384
27 weeks, 1942				44	533	3,683	2,257	238	32	227	526	1,072

[1] New York City only.

[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 26, 1943

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	60	2	2	0	0	0	0	0
New Hampshire:												
Concord	0	0	------	0	1	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	1	0	0	0
Massachusetts:												
Boston	2	0	------	0	130	20	11	0	101	0	1	16
Fall River	0	0	------	0	34	0	2	0	2	0	0	7
Springfield	0	0	------	0	21	0	0	0	11	0	0	1
Worcester	0	0	------	0	8	0	7	0	4	0	0	5
Rhode Island:												
Providence	0	0	------	0	70	2	2	0	15	0	0	29
Connecticut:												
Bridgeport	0	0	------	0	4	0	2	1	1	0	0	2
Hartford	1	0	1	0	4	2	3	0	2	0	0	1
New Haven	0	0	------	0	12	0	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	21	1	7	0	4	0	0	9
New York	14	0	4	1	1,183	28	53	4	120	0	5	87
Rochester	0	0	------	0	43	1	5	0	4	0	0	18
Syracuse	0	0	------	1	31	1	1	0	1	0	0	10
New Jersey:												
Camden	0	0	------	0	0	2	1	0	1	0	0	0
Newark	0	0	------	0	156	1	4	0	8	0	0	39
Trenton	0	0	------	0	0	0	3	0	0	0	0	1
Pennsylvania:												
Philadelphia	2	0	------	0	216	9	18	1	35	0	0	99
Pittsburgh	8	0	3	3	18	4	11	0	18	0	1	36
Reading	0	0	------	0	7	0	0	0	0	0	0	6
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0	------	0	20	1	2	0	12	0	0	11
Cleveland	5	0	------	0	17	3	12	0	13	0	0	71
Columbus	0	0	------	0	32	0	3	0	1	0	0	1
Indiana:												
Fort Wayne	0	0	------	0	4	0	0	0	0	0	0	0
Indianapolis	1	0	------	1	35	3	10	0	8	0	0	24
South Bend	0	0	------	0	6	0	0	0	2	0	0	4
Terre Haute	0	0	------	0	0	0	1	0	0	0	0	0
Illinois:												
Chicago	6	0	2	1	329	5	24	0	42	0	1	59
Springfield	0	0	------	0	4	0	0	0	0	0	0	4
Michigan:												
Detroit	5	0	------	0	418	12	12	0	14	0	0	44
Flint	0	0	------	0	11	0	0	0	0	0	0	3
Grand Rapids	0	0	------	0	80	1	1	0	0	0	0	11
Wisconsin:												
Kenosha	0	0	------	0	2	0	0	0	3	0	0	4
Milwaukee	0	0	------	0	295	1	0	0	57	0	0	36
Racine	0	0	------	0	4	0	0	0	5	0	0	2
Superior	0	0	------	0	32	0	0	0	3	0	0	4
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	133	0	0	0	4	0	0	1
Minneapolis	1	0	------	0	7	0	1	0	4	0	0	0
St. Paul	0	0	------	0	19	1	6	0	2	0	0	27
Missouri:												
Kansas City	0	0	------	0	32	1	3	1	4	0	0	7
St. Joseph	0	0	------	0	3	1	0	0	0	0	0	0
St. Louis	0	0	------	0	28	1	8	0	1	0	0	23
North Dakota:												
Fargo	0	0	------	0	0	0	2	0	0	0	0	0

City reports for week ended June 26, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Nebraska:												
Omaha	0	0		0	7	1	1	0	5	0	0	1
Kansas:												
Topeka	0	0		0	22	0	0	0	0	0	0	24
Wichita	0	0		0	0	1	1	0	2	0	0	10
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0		0	9	1	0	0	0	0	0	1
Maryland:												
Baltimore	3	0	1	1	106	3	6	0	12	0	0	123
Cumberland	0	0		0	0	0	1	0	0	0	0	0
Frederick	0	0		0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0		0	60	2	7	0	2	0	0	38
Virginia:												
Lynchburg	0	0		0	12	0	0	0	0	0	0	28
Richmond	0	0		0	10	0	3	0	4	0	1	18
Roanoke	1	0		0	0	0	0	0	1	0	0	9
West Virginia:												
Charleston	0	0		0	0	0	0	0	0	0	0	0
Wheeling	0	0		0	1	0	1	0	2	0	0	38
North Carolina:												
Wilmington	0	0		0	2	0	0	0	0	0	0	8
Winston-Salem	0	0		0	0	0	2	0	0	0	1	34
South Carolina:												
Charleston	0	0		0	0	0	0	0	0	0	0	0
Georgia:												
Atlanta	0	0	8	0	10	0	4	0	4	0	0	5
Brunswick	0	0		0	1	0	0	0	0	0	0	0
Savannah	0	0		0	0	0	0	0	0	0	0	0
Florida:												
Tampa	0	0		0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0		0	15	0	0	0	0	0	0	19
Nashville	0	0		0	4	0	2	0	0	0	0	7
Alabama:												
Birmingham	0	0	1	0	10	2	3	1	0	0	0	10
Mobile	1	0		0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0		0	0	0	1	0	0	0	0	1
Louisiana:												
New Orleans	0	0	1	0	7	0	7	8	0	0	2	4
Shreveport	0	0		0	0	0	5	1	0	0	0	0
Texas:												
Dallas	3	0		0	0	2	7	2	1	0	1	11
Galveston	0	0		0	0	0	1	5	0	0	0	7
Houston	2	0		1	0	1	6	2	0	0	0	13
San Antonio	0	0		0	0	0	0	1	2	0	0	6
MOUNTAIN												
Montana:												
Billings	0	0		0	22	0	1	0	0	0	0	0
Great Falls	0	0		0	25	0	0	0	2	0	0	6
Helena	0	0		0	0	0	0	0	0	0	0	1
Missoula	0	0		0	4	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	1	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	2	1	9	0	18	1	2	0	1	0	0	19
Pueblo	0	0		0	3	0	0	0	0	0	0	8
Utah:												
Salt Lake City	0	0		0	32	0	0	0	6	0	0	30

City reports for week ended June 26, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	2	0		0	78	1	4	0	5	0	0	16
Spokane	1	0	1	1	18	0	3	0	5	0	1	8
Tacoma	0	0		0	2	3	3	0	1	0	0	5
California:												
Los Angeles	4	0	9	1	101	8	5	6	19	0	0	39
Sacramento	0	1		0	2	0	2	10	2	0	0	6
San Francisco	1	0	1	0	36	1	8	2	16	0	1	32
Total	67	2	42	11	4,147	130	305	40	595	0	15	1,288
Corresponding week, 1942	47	2	42	9	2,877	41	245	9	493	0	24	1,142
Average, 1938-42	69		30	[1] 13	[2] 2,891		[1] 245		671	5	29	1,206

Anthrax.—Cases: New Orleans, 1.
Dysentery, amebic.—Cases: New York, 4; Philadelphia, 1.
Dysentery, bacillary.—Cases: Hartford, 1; New York, 2; Rochester, 1; Syracuse, 1; Chicago, 1; Detroit, 1; St. Louis, 1; Baltimore, 1; Charleston, S. C., 43; Atlanta, 1; Nashville, 3; Los Angeles, 3.
Dysentery, unspecified.—Cases: San Antonio, 12.
Rocky Mountain spotted fever.—Cases: Spokane 1.
Typhus fever.—Cases: New York, 1; Atlanta, 1; Tampa, 1; Dallas, 1; Galveston, 2; Houston, 3.
[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 89 cities in the preceding table (estimated population, 1942, 34,720,600)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
NEW ENGLAND	7.5	0.0	2.5	0.0	855	64.6	72.1	2.5	340	0.0	2.5	154
MIDDLE ATLANTIC	10.7	0.0	3.1	2.2	747	21.0	45.9	2.2	85	0.0	2.7	136
EAST NORTH CENTRAL	11.1	0.0	1.2	1.2	753	15.2	38.0	0.0	93	0.0	0.6	162
WEST NORTH CENTRAL	2.0	0.0	0.0	0.0	491	11.7	43.0	2.0	43	0.0	0.0	182
SOUTH ATLANTIC	6.8	0.0	15.4	1.7	361	10.3	42.8	0.0	43	0.0	3.4	517
EAST SOUTH CENTRAL	5.9	0.0	5.9	0.0	172	11.9	35.6	5.9	0	0.0	0.0	214
WEST SOUTH CENTRAL	14.7	0.0	2.9	2.9	21	8.8	79.2	41.1	9	0.0	8.8	123
MOUNTAIN	16.1	8.0	80.4	0.0	836	8.0	24.1	0.0	72	0.0	0.0	515
PACIFIC	14.0	1.7	19.2	3.5	414	22.7	43.7	31.5	84	0.0	3.5	185
Total	10.1	0.3	6.3	1.7	623	19.5	45.8	6.0	89	0.0	2.3	193

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Outbreak of mild influenza.—Under date of July 10, 1943, Dr. Richard Lee, Territorial Commissioner of Health, reported an epidemic of mild type of influenza among the civilian population of Honolulu, with a total of 4,177 cases since June 16.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 12, 1943.—During the week ended June 12, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox	2	42		186	406	41	49	44	93	863
Diphtheria		14	3	12		6				35
Dysentery (bacillary)				5						5
German measles		2		17	162	13	14	39	34	281
Influenza		1	1		7	8				17
Measles		81	2	259	2,089	96	101	256	343	3,227
Meningitis, meningococcus		1		4	3			1	1	10
Mumps		115	2	12	482	59	22	78	105	875
Poliomyelitis						1				1
Scarlet fever	4	23	9	68	123	43	37	57	30	394
Tuberculosis (all forms)		8	10	158	57	23		7	39	302
Typhoid and paratyphoid fever				9	6	4		1		20
Undulant fever					1					1
Whooping cough				61	124	38	35	26	49	333

SWEDEN

Notifiable diseases—April 1943.—During the month of April 1943, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	8	Scarlet fever	2,117
Diphtheria	173	Syphilis	43
Dysentery	30	Typhoid fever	2
Gonorrhea	1,184	Undulant fever	5
Paratyphoid fever	10	Weil's disease	3
Poliomyelitis	5		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Palestine—Raanana.—For the week ended June 5, 1943, 3 cases of plague were reported in Raanana, Palestine.

Senegal.—Plague has been reported in Senegal as follows: For the period May 31 to June 16, 1943, 6 cases with 4 deaths were reported in Dakar and for the week ended June 28, 1943, 3 cases with 2 deaths were reported in the same place. In the vicinity of Tivaouane, for the period May 21–31, 1943, 20 cases of plague with 11 deaths were reported and on June 3, 1943, 3 fatal cases were reported.

Smallpox

Algeria.—For the period June 1–10, 1943, 53 cases of smallpox were reported in Algeria.

French Guinea.—For the period May 11–20, 1943, 93 cases of smallpox with 9 deaths were reported in French Guinea.

Iran.—For the period February 27 to April 16, 1943, 85 cases of smallpox were reported in Iran.

Niger Territory.—For the period May 11–20, 1943, 32 cases of smallpox with 3 deaths were reported in Niger Territory.

Sudan (French).—For the period May 11–20, 1943, 526 cases of smallpox with 16 deaths were reported in French Sudan.

Syria and Lebanon.—Smallpox has been reported in Syria and Lebanon as follows: Week ended May 15, 1943, 28 cases; week ended May 22, 1943, 40 cases.

Typhus Fever

Algeria.—For the first 10 days of June 1943, 282 cases of typhus fever were reported in Algeria, 27 cases of which were reported among Europeans.

Germany.—For the months of September to December 1942, inclusive, 367 cases of typhus fever were reported in Germany.

Hungary.—During the week ended June 12, 1943, 32 cases of typhus fever were reported in Hungary.

Iran.—For the period February 27 to April 16, 1943, 2,907 cases of typhus fever were reported in Iran, including 1,712 cases reported in Tehran.

Rumania.—For the period June 16–23, 1943, 194 cases of typhus fever were reported in Rumania.

Spain.—Typhus fever has been reported in Spain as follows: For the week ended May 8, 1943, 44 cases were reported in all of Spain. During the month of May, 34 cases with 5 deaths were reported in Bilbao and for the period June 15–22, 1943, 12 new cases of typhus fever were reported in the same locality.

Yellow Fever

Belgian Congo—Leopoldville.—During the week ended May 22, 1943, 1 case of yellow fever with 1 death was reported in Leopoldville, Belgian Congo.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 53 JULY 23, 1943 NUMBER 30

IN THIS ISSUE

Extent of Immunizations in Large Cities

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Public Health Reports

Vol. 58 • JULY 23, 1943 • *No. 30*

EXTENT OF IMMUNIZATION AND CASE HISTORIES FOR DIPHTHERIA, SMALLPOX, SCARLET FEVER, AND TYPHOID FEVER IN 200,000 SURVEYED FAMILIES IN 28 LARGE CITIES [1]

By SELWYN D. COLLINS, *Head Statistician*, and CLARA COUNCELL, *Associate Statistician, United States Public Health Service*

CONTENTS

The use of all available measures to prevent the spread of infectious disease is an obligation of peace that is increased during war. The increase of sickness during such emergencies has in the past been widespread and has appeared to be inevitable. It is only within the present century that attempts at prevention and control show encouraging evidence that morbidity and mortality among soldiers and civilians can be curbed by the application of increasing knowledge about sanitation, personal hygiene, and immunization.

For only a few of the many infectious diseases is active artificial immunization available and commonly used (*3, 5, 26, 27, 34*). Venereal diseases and tuberculosis, which are among the greatest wartime problems, are at present entirely outside of the purview of immunization. The control of meningitis, poliomyelitis, encephalitis, and influenza with its complicating pneumonia, now rests largely upon therapeutics. Mumps and chickenpox which are of low fatality but high incidence are subject only to quarantine and isolation. The prevention of malaria is almost entirely a matter of environmental sanita-

[1] From the Division of Public Health Methods, National Institute of Health. This is the second in a series of papers (*10*) on communicable diseases and immunizations in this group of surveyed families. Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Projects Nos. 712159-658/9999, 765-23-3-10, and 65-2-23-356.

The authors are indebted to Mrs. Dorothy Clark, who was in immediate charge of coding, tabulation, and statistical computation for the study.

tion; and that of dysentery and epidemic typhus are also based mostly upon sanitation and personal hygiene, with immunization as a possible adjunct. There is evidence that protection against the jungle type of yellow fever, Rocky Mountain spotted fever, plague, cholera, tetanus, and typhoid and paratyphoid fever can be attained by the use of combined measures including immunization of persons likely to be exposed. It is only within the past two decades that a limited suppression of scarlet fever, whooping cough, and measles appeared possible by the use of immunization and related procedures. The use of vaccination as the most effective means of control is best illustrated in smallpox and diphtheria.

I. RECENT IMMUNIZATION AND DISEASE TRENDS

Diphtheria, smallpox, scarlet and typhoid fevers were selected for study with respect to the extent of immunization and case history because active immunization against these infections has been available for a considerable period. Aside from epidemic waves and sporadic outbreaks, the mortality from all four of these diseases has decreased consistently since 1900 or earlier. The case incidence of diphtheria, smallpox, and typhoid fever has also declined sharply, but the available evidence indicates that the decline in scarlet fever mortality has been due largely to decreasing case fatality rather than lessened incidence (*9*, *31*, *39*, p. 377).

A comparison of rates for smallpox and typhoid fever in the United States Army during the last three wars shows impressive declines:

	Annual rates per 1,000 strength (*35*)			
	Smallpox		Typhoid fever	
	Cases	Deaths	Cases	Deaths
Civil War, 1861–1866	8.0	2.8	29.9	11.0
Spanish-American War, 1898–1901	1.8	.58	141.6	14.8
World War, 1917–1919	.21	.003	.37	.05

In spite of generally favorable trends, sizable epidemics of these diseases still occur. In the winter of 1940–41 a simultaneous outbreak of gravis diphtheria, scarlet fever, and meningococcus meningitis occurred in Nova Scotia. An unusually high incidence in the older ages was noted for diphtheria and scarlet fever. Of 588 cases of diphtheria among civilians in this epidemic, 46 percent were under 15 years of age; 40 percent 15 to 29 years; and 14 percent 30 years old or over (*28*). The percentage of Schick positives among adults was so high as to arouse some question as to methods used and the potency of the toxin, but Campbell (*8*) has indicated that all readings

were made or supervised by trained public health officers of experience and the toxin prepared by a reliable laboratory.

Groups tested in Nova Scotia, 1940-41	Number tested	Percent Schick positive (8)
Royal Canadian Air Force (after outbreak):		
Group A	465	47
Group B	250	55
Dalhousie University students	405	59
Trainees at camp	—	71
Normal-school students	243	80
Civil servants	250	80
Adults taken at random from town of 3,600 population	558	87

These proportions indicate the large amount of susceptible material for epidemics in at least some places. The acceptance by the general public of diphtheria immunization as a protection against attack was evidenced by the more than 14,000 persons who passed through the immunization clinic during an intensive campaign.

A striking illustration of public confidence in the protection afforded against smallpox was evident in the large number of vaccinations which followed the local outbreak of 63 cases and no deaths which occurred in Pennsylvania in December 1942 and January 1943. Over 70,000 persons were vaccinated in Philadelphia and many thousands in other parts of Pennsylvania and nearby States. The Pennsylvania Railroad ordered the vaccination of its 160,000 employees in 14 States and a campaign among industrial workers was initiated in Baltimore. Hospitals, schools, municipal and State agencies, and fire departments carried out mass vaccination of employees.

Sporadic outbreaks of typhoid fever still appear occasionally. Fifty cases occurred in Honolulu early in 1942, all in one public school. Subsequently mass inoculations against typhoid fever and smallpox were started and extended throughout the islands in a campaign to immunize the entire population.

Immunizations in the armed forces.—Protection against infection may be divided into two main classes—immunization that is routine for all or a large part of the armed forces, and the use of vaccines in the event of known or anticipated exposure. The program of 1942 in the armed forces of the United States required smallpox, typhoid, paratyphoid, and tetanus inoculations. Protective agents were available for susceptibles exposed to outbreaks of such diseases as diphtheria and scarlet fever. Yellow fever, plague, cholera, and typhus vaccines were restricted to those bound for areas in which there was a threat of exposure, or times when definite outbreaks occurred.

In the British Army in 1940 emphasis was placed upon immunization against smallpox, typhoid fever, and tetanus. All procedures were voluntary but a high proportion of the troops were inoculated.

Cholera, plague, typhus, and yellow fever vaccines were available when there was likelihood of exposure to these infections. As a result of outbreaks of diphtheria and scarlet fever during the winter and spring of 1940–41, the Royal Canadian Air Force initiated Schick and Dick testing of all personnel either in or entering the Service, with injections for all positive reactors (*33*).

Immunization of civilians.—It was to be expected that intensive control measures would be introduced among civilians in theaters of war unless there was a breakdown of health services. In discussing the importance of prophylactic measures in England in 1941, White (*38*) noted that while the Ministry of Health recommended immunization against the enteric group, a combination of anti-typhoid-paratyphoid vaccine and tetanus toxoid (T. A. B. T.) was being used in large quantities for the immunization of factory workers.

The consensus of opinion has been that inoculation of the total population of England against the enteric fevers would not be advised. Where epidemics existed or threatened, mass inoculations could well be used, and the protection of groups running special risks of infection was considered advisable. Volunteers for this type of immunization have steadily increased in England (*5*), and a large part of the population has been inoculated.

At least one-third of the children in England and Wales are estimated to have been immunized against diphtheria (*22*). In 1941–42 a survey covering 7,596 children of 3,930 mothers in 25 localities was conducted in an attempt to determine why there had not been better response to the recent campaign. It was found that 9 out of 10 mothers were aware of the immunization scheme and that schools and welfare centers were on the whole the most satisfactory means of reaching children for both frequency and effectiveness. Haphazard sources, such as posters, films, radio, and newspapers, seemed least effective. Improved organization of school and child welfare services for immunization of preschool children was recommended (*16*).

The Horder Committee (British) recommended diphtheria immunization, and more extensive use of whooping cough vaccine has also been advocated (*38*). Active immunization for scarlet fever was not considered particularly necessary in view of the general mildness of the disease and the satisfactory use of antitoxin after the disease is contracted.

The use of a triple vaccine for diphtheria, tetanus, and typhoid and paratyphoid fevers was considered for all French civilians between 6 and 30 years of age. At a meeting of the French Academy of Medicine in September 1940 it was recommended that the law regarding diphtheria inoculation be enforced and that mixed diphtheria and tetanus vaccine be employed (*18*). The use of triple vaccine was advised wherever there was the threat of an outbreak of typhoid or

paratyphoid fever. The importance of the prompt and complete reporting of communicable diseases was emphasized.

The United States Children's Bureau has recommended that all children of 9 months or older should be immunized against diphtheria unless they are already protected (*36*). Vaccination against smallpox was urged, preferably between the ages of 3 and 12 months. City, State, and Federal health organizations have taken an active part in campaigns for the extension of diphtheria and smallpox vaccination. The promotion of immunization among young children was considered so important that in 1942 a proclamation was issued by the President of the United States requesting that each community exert every effort that all children over 9 months of age be immunized against diphtheria and smallpox.

An analysis of State smallpox vaccination laws in the United States in 1939 and 1940 indicates great variation. Thirteen States [2] including the District of Columbia had laws requiring vaccination as a prerequisite to school attendance, regardless of the presence or absence of smallpox in the community; in six other States [2] the statutes gave the local authorities power to require vaccination as a prerequisite to school attendance (*19*). However, some of the laws for compulsory vaccination applied only to public schools or to schools in large cities, and in one State the local authorities were empowered to suspend the law under certain circumstances. Many of the States had permissive vaccination provisions in their laws which could not be evaluated. A few States had statutes which prohibited the local authorities from requiring vaccination as a prerequisite to school entrance, and one State forbade making any form of vaccination or inoculation a condition precedent for admission to any public or private school or college or for the exercise of any right, the performance of any duty, or the enjoyment of any privilege.

Statutes or regulations pertaining to diphtheria immunization existed in nine States by the end of 1941 (*20*). North Carolina was the only State which required general immunization of children; in West Virginia it was required and in New Jersey it could be required by local authorities as a prerequisite to school attendance. In Kansas nonimmunized pupils could be excluded from school by local authorities when diphtheria was present in the community. Illinois, Kentucky, and New York required immunization of specified persons in certain institutions. In Virginia, local boards of health were authorized to provide for the administration of toxoid if, in their opinion, it appeared necessary to prevent an epidemic.

[2] The 13 States whose statutes required vaccination as a prerequisite to school entrance were: Arkansas, District of Columbia, Kentucky, Maryland, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, South Carolina, Virginia, West Virginia. The 6 States whose statutes gave the local authorities power to require vaccination as a prerequisite to school entrance were: Connecticut, Georgia, Maine, New Jersey, Ohio, Oregon.

II. SCOPE AND METHOD OF IMMUNIZATION SURVEY

The survey of immunizations here reported upon was made in 1936 in a group of large cities scattered throughout the country. The evidence available indicates that the general level of diphtheria immunization has increased considerably since that time, but there are no indications that the level of smallpox vaccination has changed materially in recent years.[3] Immunization against scarlet and typhoid fevers (except typhoid in the South) seems to be practiced on such a small scale that it is impracticable to measure changes. The findings of the present survey are here recorded by geographic section, family income, and nativity and color of the family head. It seems probable that relative variations as between these groups are reasonably characteristic of the present even though the actual level of immunization may have changed.

The survey covered by house-to-house canvass a total of 213,931 families in 28 cities of 100,000 population or more, located in 19 States. These cities were generally representative of the geographic distribution of the 93 cities of 100,000 or more population in 1930.[4] Within each city the areas that were canvassed consisted of census enumeration districts of 1930, selected from the total of these districts in a way to obtain a representative sample of the entire city. The details about sampling procedures were set forth in a preceding paper and need not be repeated here (*10*). The same paper gives considerable data on the distribution of the canvassed population according to age, color, nativity of parents, and geographic section, in comparison with 1930 census data for the 28 surveyed cities and the 93 cities of 100,000 or more population in 1930.

Enumerators visited all residences within the selected districts of each city. All data were recorded during this single visit to the household. Refusals to give information were negligible and the percentage of informants who were not entirely cooperative was also small. Data were recorded for each person under 25 years of age on the history of an attack of or immunization against diphtheria, smallpox, scarlet fever, and typhoid fever at any time since birth.[5] Other information included a roster of the family, with age, sex, color, relationship to household head, and other pertinent data for each member.

[3] Data on the number of smallpox and diphtheria immunizations done each year, as reported by State health authorities to the U. S. Children's Bureau (*37*), are available for the years 1937–41. However, it is not possible to estimate from them the proportions of children of specific ages who have been immunized, and no data by income, nativity, or color are included. A later section of this paper considers the above reports in more detail.

[4] The 28 cities sampled and the total numbers of canvassed families were: Atlanta 5,563, Baltimore 13,796, Birmingham 4,767, Boston 14,739, Buffalo 13,210, Chicago 16,143, Cleveland 15,717, Columbus 5,219, Dallas 5,607, Detroit 9,953, Fall River 4,356, Flint 2,500, Grand Rapids 2,563, Houston 5,301, New Orleans 6,931, Newark 6,867, Oakland 4,489, Philadelphia 11,341, Pittsburgh 10,131, Portland, Oreg., 6,309, Richmond 5,671, St. Louis 12,757, St. Paul 5,345, Salt Lake City 4,392, Seattle 5,097, Spokane 4,580, Syracuse 5,895, Trenton 4,692.

[5] History of attack by nine other diseases was recorded and is the subject of other reports (*10*).

The survey was made early in 1936; the canvassing was done between the middle of March and the middle of June, 90 percent of the schedules being taken in the approximately 2 months from April 7 to June 3, and 50 percent within the 4 weeks from April 22 to May 20. Some additional information was obtained about cases and immunizations that took place within 12 months of the date of the canvass; the data as presented in this paper represent histories of immunizations prior to that "study year," which means histories as of the spring of 1935. Ages of the children as stated in this paper are corrected to correspond to the time to which the history applies, that is, they are one year less than the age at the time of the survey in 1936. A later paper will consider immunizations that occurred during the 12 months ending on the day of the canvass.

There was a total of 761,968 persons of all ages in the families canvassed. This represented 2 percent of the aggregate population of the 93 cities of 100,000 or more inhabitants, and 5 percent of the total population of the 28 surveyed cities. The proportion of the population covered varied with size of city from 2 percent in Chicago to 16 percent in Fall River. Although the sampling ratios were small for the largest cities, those with 800,000 or more population contributed 38 percent of the canvassed population but made up 58 percent of the total population of the 28 surveyed cities and 48 percent of the population of the 93 cities of 100,000 or more in 1930 (table 1).

The canvassed sample includes a total of 182,640 children under 15 years of age at the time of the survey in 1936. Immunizations for the diseases considered in this paper are most frequent in this age group and accurate histories cannot be obtained for the older adults by house-to-house canvass. Because of these facts this paper is confined largely to the ages under 15 years, but a few data are shown for children up to 20 years.

TABLE 1.—*Distribution according to size of city of residence of the canvassed population, the total population of the 28 canvassed cities, and the total population of the 93 cities over 100,000 in 1930*

Size of city	Percentage of the population that resided in each size of city			Number of cities	
	Canvassed in 28 cities	Total in 28 cities	Total in 93 cities	28 cities	93 cities
All sizes	100.0	100.0	100.0	28	93
100,000 but under 400,000	36.7	23.6	36.3	17	75
400,000 but under 800,000	25.0	18.1	15.3	5	10
800,000 or over	38.3	58.3	48.4	6	8
Total population	761,968	16,156,756	36,325,836		

III. DATA FOR ALL SURVEYED CITIES [6]

Of the four diseases covered in this paper, immunization against three of them had been known and used on human beings for at least 20 years and the other (scarlet fever) for about 12 years prior to the study. However, as seen in figure 1 and table 2, the numbers of immunizations [7] against scarlet and typhoid fevers are almost negligible as compared with smallpox and diphtheria. From birth through the fourth year of age more children in this surveyed group had been immunized against diphtheria than had been vaccinated against smallpox. However, at 5 years when children enter kindergarten there is a rapid rise in the percentage who had been vaccinated, and after this age smallpox vaccinations are much more frequent than diphtheria immunizations. By 8 years 85 percent of the children had been vaccinated against smallpox as compared with 61 percent immunized against diphtheria. By 14 years 90 percent had been vaccinated against smallpox, but the percentage immunized against

[6] In a preceding paper (*10*) on the common communicable diseases of childhood, most of the rates were based on children of the family head because it appeared that reporting on that group was more complete than on other children living in the household. In the percentages immunized, some differences between the two groups were found but it seemed entirely possible that they represented real differences in the fre quency of immunization. However, the differences in percentages immunized in the two groups were not large, the relative age curves of percentages immunized were nearly identical, and the numbers of children other than those of the head were small, so that the percentages for all children were practically the same as or children of the head. The following table shows the two groups separately:

History of immunization against four communicable diseases at any time since birth among children of the household head and other children living in the household—canvassed white families in 28 large cities in 19 States, 1935

Relationship to household head	Age last birthday									
	All under 15	Under 5	5–9	10–14	15–19	All under 15	Under 5	5–9	10–14	15–19
	Percentage with history of immunization but no case									
	Diphtheria					Smallpox				
All children	48.0	29.4	55.8	55.4	43.5	62.7	14.6	75.2	88.4	89.7
Children of head	48.4	29.7	56.1	55.7	44.4	62.9	14.7	75.3	88.5	90.6
Other children	38.1	21.3	46.5	46.8	36.1	57.6	12.4	72.9	86.8	83.3
	Scarlet fever					Typhoid fever				
All children	1.93	.83	2.14	2.58	2.30	1.67	.57	1.78	2.42	2.90
Children of head	1.93	.82	2.15	2.59	2.29	1.66	.57	1.77	2.40	2.69
Other children	1.83	1.08	1.92	2.46	2.40	1.88	.54	1.90	3.11	4.47
	Children of head observed					Other children observed				
Number observed	160,017	45,820	54,340	59,857	52,906	5,476	1,852	1,665	1,959	6,956

Children of the household head include own, step, and adopted children.

[7] "Immunization" is used in this paper to mean the injection of the usual number of doses of the material that is presumed to produce immunity to the specific disease; no data are available on tests following the injections to indicate whether the process actually produced immunity in the individual, except that 94 percent of all smallpox vaccinations done during the study year for children under 20 years of age were reported as "successful."

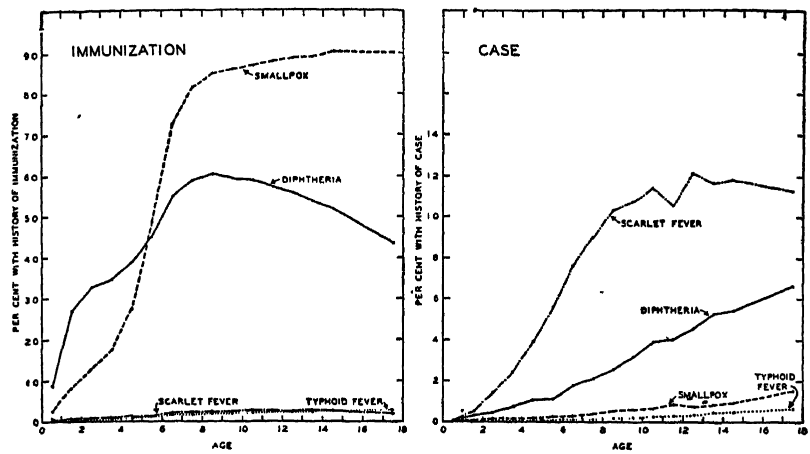

FIGURE 1.—History of immunization against and of attacks of four communicable diseases at any time since birth among children of specific ages at the time of the study—canvassed white families in 28 large cities in 19 States, 1935.

TABLE 2.—*History of immunization against and of attacks of four communicable diseases at any time since birth—canvassed white families in 28 large cities in 19 States, 1935*

Age last birthday [1]	Percentage with history of—								Number of children observed [2] (population)
	Immunization at any time but no case				Case at any time				
	Diphtheria	Smallpox	Scarlet fever	Typhoid fever	Diphtheria	Smallpox	Scarlet fever	Typhoid fever	
Under 1	8.8	2.5	0.22	0.07	0.05	0.01	0.1	0.01	7,687
1	27.2	8.5	.77	.42	.33	.02	.5	----------	9,768
2	32.6	12.8	.82	.47	.49	.04	1.4	.03	9,715
3	34.5	17.6	.87	.72	.79	.09	2.4	.03	9,924
4	38.6	27.6	1.29	1.01	1.10	.12	3.9	.04	10,578
5	44.9	48.8	1.40	1.27	1.16	.23	5.7	.09	10,551
6	54.6	72.7	2.19	1.67	1.80	.27	7.7	.10	10,885
7	58.7	81.5	2.32	1.76	2.14	.36	9.0	.10	11,470
8	60.5	84.9	2.39	2.04	2.58	.52	10.3	.13	11,395
9	59.3	85.7	2.34	2.10	3.17	.61	10.7	.19	11,704
10	58.9	86.9	2.64	2.23	3.90	.67	11.4	.24	11,979
11	57.1	87.7	2.65	2.27	4.09	.83	10.6	.25	12,723
12	55.7	88.5	2.36	2.20	4.53	.78	12.2	.30	12,139
13	53.6	88.9	2.65	2.62	5.26	.80	11.6	.45	12,768
14	51.8	90.0	2.61	2.78	5.41	.91	11.8	.43	12,207
15	48.9	89.6	2.27	2.52	6.00	1.07	11.7	.48	12,525
16	45.6	89.6	2.21	2.44	6.13	1.39	11.4	.48	11,661
17	43.9	90.4	2.30	2.53	6.70	1.37	10.9	.60	12,382
18	40.7	89.7	2.38	3.48	6.97	1.85	11.1	.67	11,763
19	37.7	89.4	2.35	3.56	7.50	1.94	11.0	.89	11,531
All under 20	46.8	69.9	2.03	2.00	3.71	.73	8.7	.29	225,355
All under 15	48.0	62.7	1.93	1.67	2.64	.45	7.8	.17	165,493
Under 5	29.4	14.6	.83	.57	.58	.06	1.8	.02	47,672
5–9	55.8	75.2	2.14	1.78	2.19	.40	8.8	.12	56,005
10–14	55.4	88.4	2.58	2.42	4.64	.80	11.5	.34	61,816
15–19	43.5	89.7	2.30	2.90	6.65	1.51	11.2	.62	59,862

[1] Ages in this and later tables are stated as of the beginning of the study year, which is the 12 months immediately preceding the date of the canvass; histories are set down as of this same time. The immunizations and cases during the study year are to be considered in more detail in a later paper.

[2] In this and all succeeding tables the numbers observed represent the numbers known as to whether ever immunized against diphtheria; for the other three diseases the numbers known as to immunization may be somewhat below or above the populations given in the tables, but in every case the percentages are based on the numbers known for the disease in question.

diphtheria declines after 8 years of age. These curves are cumulative in nature because the data for each age represent the percentage who had been immunized at any time since birth; however, few persons are immunized against diphtheria after they become 15 years of age, so that those who arrive at that age without being immunized are less likely to be immunized at a later age. When diphtheria immunization has been widely practiced for 20 or 30 years, the curve will presumably continue to rise with age.

Scarlet fever immunizations do not get above 3 percent for any age and typhoid exceeds this figure only at 18 and 19 years. This statement refers to the group of cities as a whole—in certain geographic sections immunizations for these diseases are more frequent.

The data on smallpox vaccinations were not tabulated in a way to show what percentages of the children of specific ages had been vaccinated within a given period—say 7 years. However, 59 percent of white children 15 and 16 years of age who were vaccinated during the study year represented first vaccinations, and 47 percent of those at 18 and 19 years were first vaccinations. Thus of the rather small percentages of these older children who received vaccinations during the study year roughly half were revaccinations. In a preceding study (*11*) it was found that 51 percent of the 15- and 16-year-old children who had ever been vaccinated had been vaccinated within 7 years; the corresponding figure for 18- and 19-year-olds was about 40 percent.

For typhoid fever there is still less evidence of reimmunization; 91 percent of all typhoid immunizations among white children under 20 years of age during the study year were first immunizations, and even at 15–19 years of age only 11 percent of the immunizations were reimmunizations.

The right half of figure 1 shows the percentage of children who had had a case of each of the four diseases. Scarlet fever has the highest proportion, reaching about 12 percent at 12 years of age, with diphtheria second, reaching 6.6 percent at 15–19 years and 7.5 percent at 19 years of age. It should be noted, however, that the diphtheria curve rises at an abnormally steep rate because the older children represented in this chart lived through a period when this disease was more prevalent than in any year since the birth of the children under 5 years of age. The same is true of typhoid fever, on a relative basis, but the prevalence of this disease has been quite low throughout the 20 years represented by the lives of even the oldest of these children. It is, of course, not intended to suggest that immunization is solely responsible for the low incidence of these diseases—obviously

in some of them the incidence has been greatly influenced by other factors.[8]

IV. GEOGRAPHIC VARIATION

Inasmuch as colored children are largely concentrated in one geographic section, it will be of interest to consider first the percentage of white children in each section who had been immunized. Figure 2 affords a comparison for large cities in 5 geographic sections of the percentage of white children of specific ages who had been immunized against the four diseases (tables 3 and 4). Similar data on the percentage of children who had suffered an attack of the same diseases are also included. The immunization situation may be considered as it exists at several different ages.

Diphtheria.—Considering diphtheria immunization (fig. 2 and table 3) the maximum proportion immunized, which occurs within the ages from 7 to 9 years in all sections, varies from 67 percent in the North Central region to 50 percent in the South. In every instance there is a decrease after those ages for reasons already noted, but in the Northeast with a maximum of 63 percent there is practically no decrease until 12 years of age.

Diphtheria immunization at early ages is important; for the ages of 2 and 3 years the Intermediate cities were the highest with 44 and 43 percent, respectively, as compared with 14 and 19 percent at those ages in the West. In these early preschool ages the South, which was lowest in most of the school ages, was higher than the Northeast and almost as high as the North Central, which were the two highest sections for practically all of the school ages.

In diphtheria case histories (fig. 2 and table 4) the South and Intermediate were at the top, in spite of a high immunization rate in the latter group for the preschool ages. However, these diphtheria case history curves also represent a cumulative process and many of the cases may have occurred prior to the time of extensive immunization. On the other hand, diphtheria case histories are low in the West in spite of low immunization rates in the preschool ages; in the school ages the West is moderately high in diphtheria immunizations.

The decline in diphtheria death rates in the South has also lagged behind other sections, so that the area of high mortality as well as that of high case incidence has moved in the past 30 years from the North to the South. According to a summary of diphtheria mortality in large cities in nine geographic regions, the three Southern sections have all had higher rates during the past decade than the three Northern sections (*1*, *17*).

[8] No data are shown by sex in this paper. Preceding studies (*11*, *12*, *13*, *14*) indicated that differences between males and females in the percentages who had been immunized against the diseases included in this study were negligible except for typhoid fever, particularly in the ages representing men who had been in the armed forces.

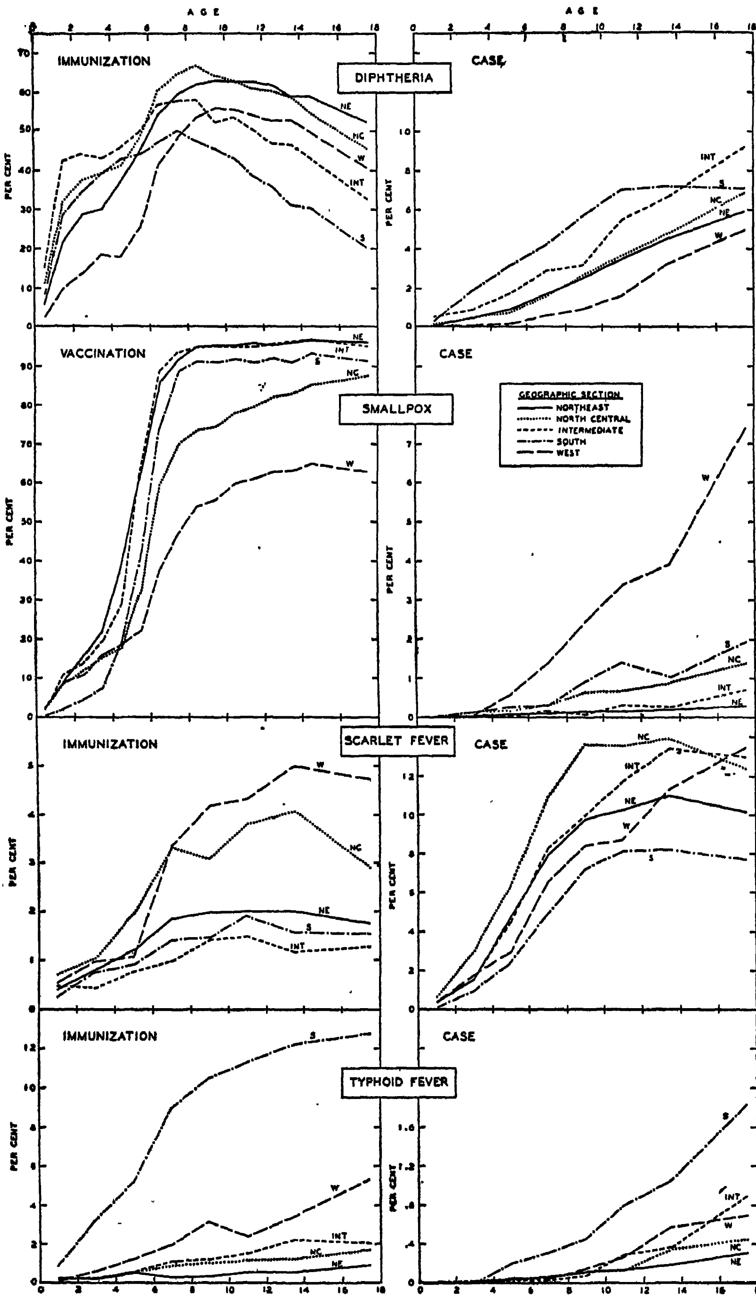

FIGURE 2.—History of immunization against and of attacks of four communicable diseases at any time since birth among children in five geographic sections—canvassed white families in 28 large cities in 19 States, 1935. (See footnote 1 to table 4 for definition of sections.)

TABLE 3.—*History of immunization against diphtheria and smallpox at any time since birth among children in five geographic sections*[1]*—canvassed white families in 28 large cities in 19 States, 1935*

Geographic section[1]	Age last birthday: Under 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Percentage with history of immunization but no case														
Diphtheria:															
Northeast	5.7	22.0	28.7	30.1	37.3	44.8	54.4	59.4	62.1	62.9	62.9	62.6	61.7	59.1	59.0
North Central	11.5	32.0	37.5	39.5	41.2	48.2	60.4	64.6	66.7	64.2	63.0	61.1	60.3	59.1	54.9
Intermediate	15.8	42.5	44.2	43.1	45.8	49.7	56.9	57.8	58.1	52.3	53.8	50.8	47.1	46.6	43.3
South	8.9	28.6	34.5	39.3	43.1	44.4	47.4	50.3	47.6	45.5	43.5	38.5	35.9	31.3	30.5
West	2.9	10.0	13.7	18.8	18.1	25.6	41.6	48.4	53.7	56.0	55.7	54.2	52.6	52.9	50.1
Smallpox:															
Northeast	2.9	9.2	15.7	22.0	39.1	63.7	85.7	91.9	95.1	95.5	95.5	96.2	95.5	96.4	96.4
North Central	2.8	8.7	12.1	15.3	18.1	32.7	58.7	69.8	73.6	74.6	78.0	79.5	81.8	83.0	85.1
Intermediate	2.5	11.2	13.9	19.6	29.4	65.2	88.9	93.6	94.9	95.0	95.1	95.2	95.7	96.4	96.9
South	.4	2.4	4.5	7.7	19.4	40.7	74.3	88.7	91.3	91.0	91.9	91.0	92.1	91.1	93.3
West	2.6	8.8	11.2	16.1	18.4	22.3	37.5	47.2	54.0	55.9	60.0	61.1	63.0	63.2	64.8
	Number of children observed														
Population:															
Northeast	2,765	3,727	3,709	3,741	3,921	3,978	3,923	4,303	4,256	4,466	4,545	4,860	4,647	4,805	4,673
North Central	2,363	2,709	2,739	2,771	3,082	3,155	3,192	3,302	3,254	3,366	3,346	3,541	3,410	3,558	3,360
Intermediate	960	1,338	1,327	1,361	1,447	1,414	1,582	1,599	1,596	1,629	1,659	1,779	1,753	1,740	1,674
South	756	1,088	1,052	1,119	1,193	1,153	1,227	1,250	1,293	1,287	1,325	1,409	1,279	1,467	1,321
West	843	906	888	932	935	851	961	1,016	996	956	1,104	1,134	1,050	1,198	1,179

[1] For surveyed cities included in each geographic section, see footnote 1 to table 4.

Smallpox.—In smallpox vaccinations (fig. 2 and table 3) the curves for the Northeast and Intermediate cities are quite similar with a maximum level of about 96 percent. The South is low for the early preschool ages but finally reaches a maximum level of about 92 percent. Although the North Central eventually reaches a maximum at 15–19 years of 87 percent vaccinated, it is much lower throughout the school ages than the sections mentioned above. The Western cities show by far the lowest percentages vaccinated, reaching a maximum at 14 years of only 65 percent with 63 percent at 15–19 years. At 8 years of age the Intermediate and Northeast show about 95 percent vaccinated, the South 91, the North Central 74, and the West only 54 percent.

In smallpox case histories the order of the sections is almost the opposite, as might be expected in a disease so completely controlled by vaccination. The Northeast and Intermediate regions are at the bottom but the South, in spite of slightly higher vaccination histories, is a little above the North Central. The West is far above any other region in the percentage of children with a history of smallpox.

Scarlet fever.—The percentages of children who had been immunized against scarlet fever (fig. 2 and table 4) were too small in every region to have much effect upon the prevalence of the disease. The percentages, therefore, represent the extent to which immunization

TABLE 4.—*History of immunization against and of attacks of four communicable diseases at any time since birth among children in five geographic sections*[1]—*canvassed white families in 28 large cities in 19 States, 1935*

Disease and geographic section[1]	Age last birthday											
	All under 15	Under 2	2-3	4-5	6-7	8-9	10-11	12-14	Under 5	5-9	10-14	15-19
	Percentage[2] with history of immunization but no case											
Diphtheria:												
Northeast	49.6	15.1	29.4	41.1	57.0	62.5	62.8	59.9	25.9	57.0	61.0	52.3
North Central	52.4	22.5	38.5	44.7	62.5	65.5	62.0	58.2	33.2	60.9	59.7	45.5
Intermediate	48.2	31.4	43.6	47.7	57.4	55.2	52.2	45.7	39.7	55.1	48.3	32.9
South	38.7	20.5	37.0	43.7	48.9	46.5	40.9	32.5	32.5	47.1	35.9	20.3
West	33.6	6.6	16.3	21.7	45.1	54.8	55.0	51.9	12.9	45.6	53.1	40.8
Smallpox:												
Northeast	70.8	6.5	18.8	51.5	88.9	95.3	95.9	96.1	18.8	86.8	96.0	96.0
North Central	54.7	5.9	13.7	25.5	64.3	74.1	78.8	83.3	11.8	62.2	81.5	87.3
Intermediate	70.9	7.6	16.8	47.1	91.3	95.0	95.2	96.3	16.3	88.1	95.9	95.2
South	63.1	1.6	6.1	29.9	81.6	91.1	91.4	92.1	7.5	78.0	91.9	91.3
West	41.3	5.8	13.7	20.2	42.5	54.9	60.6	63.7	11.6	44.0	62.5	62.8
Scarlet fever:												
Northeast	1.59	.43	.81	1.22	1.87	2.00	2.02	2.03	.72	1.84	2.03	1.77
North Central	2.68	.75	1.07	1.99	3.32	3.10	3.81	4.06	1.16	2.98	3.61	2.91
Intermediate	1.03	.48	.45	.77	1.00	1.42	1.50	1.18	.58	1.10	1.31	1.28
South	1.29	.27	.78	.94	1.45	1.47	1.93	1.59	.65	1.35	1.73	1.54
West	3.11	.57	.99	1.12	3.38	4.19	4.33	5.00	.82	3.34	4.74	4.75
Typhoid fever:												
Northeast	.44	.20	.19	.54	.32	.41	.61	.59	.25	.41	.60	.94
North Central	.85	.16	.27	.56	.89	1.07	1.21	1.25	.28	.91	1.23	1.67
Intermediate	1.22	.26	.26	.63	1.19	1.23	1.53	2.25	.33	1.12	1.97	2.07
South	8.27	.87	3.27	5.20	8.96	10.49	11.29	12.22	2.74	9.00	11.84	12.77
West	2.07	.17	.60	1.28	2.02	3.16	2.40	3.42	.53	2.40	3.02	5.31
	Percentage[2] with history of case											
Diphtheria:												
Northeast	2.29	.11	.46	.84	1.63	2.55	3.47	4.54	.39	1.88	4.11	5.92
North Central	2.33	.20	.47	.75	1.54	2.64	3.60	4.78	.44	1.83	4.31	6.86
Intermediate	3.54	.52	.89	1.71	2.89	3.19	5.44	6.64	.92	2.83	6.16	9.21
South	4.69	.38	1.84	3.11	4.20	5.70	6.99	7.18	1.69	4.56	7.10	7.07
West	1.22	------	.11	.17	.61	.92	1.61	3.27	.04	.69	2.61	4.94
Smallpox:												
Northeast	.12	.02	.03	.11	.10	.16	.15	.19	.03	.14	.17	.31
North Central	.47	.04	.13	.18	.82	.65	.68	.89	.09	.44	.80	1.41
Intermediate	.14	------	.04	------	.16	.09	.29	.27	.02	.10	.27	.70
South	.66	------	.09	.26	.82	.89	1.42	1.03	.10	.55	1.19	1.93
West	1.99	------	.05	.61	1.41	2.46	3.39	3.92	.13	1.71	3.71	7.38
Scarlet fever:												
Northeast	7.29	.29	1.57	4.76	7.99	9.82	10.26	11.00	1.61	8.31	10.70	10.11
North Central	9.71	.59	3.02	6.41	10.88	13.64	13.55	13.91	2.66	11.33	13.77	12.35
Intermediate	8.15	.30	1.52	4.52	8.27	10.02	11.71	13.39	1.51	8.52	12.72	12.96
South	5.16	.05	.97	2.39	4.88	7.23	8.09	8.18	.84	5.50	8.15	7.66
West	6.46	.34	1.70	2.96	6.56	8.39	8.66	11.34	1.38	6.72	10.29	13.41
Typhoid fever:												
Northeast	.10	------	.03	.04	.08	.13	.14	.20	.02	.10	.17	.32
North Central	.14	.02	.05	.05	.09	.12	.14	.35	.04	.10	.27	.45
Intermediate	.16	------	.04	.03	.03	.09	.29	.38	.02	.06	.34	.89
South	.49	------	------	.21	.32	.46	.80	1.05	.04	.37	.95	1.83
West	.21	------	------	.06	.05	.15	.27	.58	------	.10	.46	.70

[1] Cities in each geographic section: *Northeast:* Boston, Fall River, Buffalo, Syracuse, Newark, Trenton, Philadelphia, Pittsburgh. *North Central:* Chicago, Cleveland, Columbus, Detroit, Flint, Grand Rapids, St. Paul. *Intermediate:* Baltimore, Richmond, St. Louis. *South:* Atlanta, Birmingham, Dallas, Houston, New Orleans. *West:* Oakland, Portland, Salt Lake City, Seattle, Spokane.

[2] See table 3 for numbers of children observed at each year of age under 15. Numbers 15–19 years were as follows: Northeast 22,820; North Central 17,441; Intermediate 7,917; South 5,995; West 5,689.

had been resorted to by individual families rather than any organized effort to control the disease by this method. In Northeast, Intermediate, and Southern cities the curves hardly get above 2 percent at any age, but in the North Central cities the curve reaches a maximum of 4.1 percent and in the West 5.0 percent.

In case histories the North Central stands somewhat above and the South somewhat below other regions.

Typhoid fever.—Typhoid immunizations in Southern cities are far in excess of those in any other region, but the West is rather high also. In the Northeast, North Central, and Intermediate regions the maxima hardly get above 2 percent; in the West and South the maxima at 15–19 years are 5 and 13 percent, respectively.

Percentages with a history of a case of typhoid fever are low in all sections, but the South stands well above the others. Immunization of 13 percent of the children would hardly be expected to affect greatly the total typhoid rate; the high immunization rate, therefore, appears to reflect the size of the problem rather than the effectiveness of the immunization procedure in controlling the disease. Typhoid fever death rates have declined to low levels in every geographic section, particularly in large cities. However, typhoid mortality rates in the Southern sections are about three times those in the Northern sections (*2*).

TABLE 5.—*History of immunization against four communicable diseases at any time since birth among children* [1] *of native and foreign-born household heads in five geographic sections* [2]—*canvassed white families in 28 large cities in 19 States, 1935*

Disease and geographic section [2]	Age last birthday							
	All under 15		Under 5		5–9		10–14	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
	Percentage with history of immunization but no case							
Diphtheria:								
Northeast	47.9	53.1	26.6	25.3	56.9	57.7	60.0	62.5
North Central	50.4	57.1	31.4	39.9	59.7	64.1	59.8	59.9
Intermediate	48.4	49.2	39.5	44.2	55.2	55.1	49.0	47.1
South	39.8	28.7	33.3	32.3	48.3	29.7	36.9	26.3
West	38.8	39.5	12.6	15.9	46.8	42.6	54.3	49.6
Smallpox:								
Northeast	65.6	79.4	16.6	24.4	85.0	89.7	95.2	97.0
North Central	47.7	68.6	9.7	18.7	57.4	72.0	76.3	88.7
Intermediate	69.8	81.3	14.9	32.4	87.6	92.6	95.9	95.9
South	62.8	70.8	7.4	14.7	77.9	80.9	91.8	90.7
West	40.0	48.2	11.1	14.9	43.6	47.7	61.7	66.0
Scarlet fever:								
Northeast	1.74	1.32	.72	.57	2.02	1.49	2.48	1.54
North Central	2.68	2.71	1.09	1.81	3.05	2.97	3.91	3.16
Intermediate	1.03	1.19	.60	.56	1.07	1.28	1.33	1.43
South	1.30	1.11	.65	1.26	1.36	1.27	1.75	.93
West	3.16	3.08	.79	1.12	3.32	3.01	5.05	3.75
Typhoid fever:								
Northeast	.45	.39	.27	.24	.43	.39	.67	.46
North Central	.93	.64	.27	.27	1.06	.58	1.46	.86
Intermediate	1.29	.44	.32	.19	1.16	.70	2.17	.36
South	8.64	2.65	2.85	1.27	9.43	2.54	12.43	3.39
West	2.19	1.82	.49	.64	2.53	2.11	3.34	2.24
	Number of children observed							
Population:								
Northeast	36,991	23,558	12,295	4,946	12,549	7,849	12,147	10,763
North Central	30,100	15,738	9,914	3,285	10,559	5,299	9,627	7,154
Intermediate	19,532	2,497	5,641	534	6,714	855	7,177	1,108
South	16,528	717	4,757	158	5,660	236	6,111	[illegible]
West	11,735	2,621	3,666	624	3,817	802	[illegible]	1,195

[1] Own, step, and adopted children of the household head.
[2] For definition of geographic sections, see footnote 1 to table 4.

TABLE 6.—*History of attack by four communicable diseases at any time since birth among children of native and foreign-born household heads in five geographic sections—canvassed white families in 28 large cities in 19 States, 1935*

Geographic section [1]	Percentage [2] of children under 15 years of age with history of a case							
	Diphtheria		Smallpox		Scarlet fever		Typhoid fever	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Northeast	2.0	2.3	0.09	0.15	8.1	5.3	0.08	0.10
North Central	2.0	2.5	.44	.47	10.4	7.5	.16	.08
Intermediate	3.2	4.1	.13	.16	7.8	6.5	.15	.06
South	4.4	6.1	.60	.72	4.9	3.4	.49	----------
West	1.1	1.1	1.90	1.69	6.3	5.6	.18	.08

[1] For definition of geographic sections see footnote 1 to table 4.
[2] Percentages for children under 15 years of age in this table are simple averages of percentages for the three 5-year age groups under that age. See table 5 for numbers of children observed.

White children of native and foreign parents.—Tables 5 and 6 show geographic variation in immunization and case histories for the four diseases for children of native white and foreign-born white parents separately. In general these two nativity groups both show geographic differences that are similar to those already discussed for all white children.

Colored children.—Considerable numbers of colored children were included in the canvassed populations of the Intermediate and Southern cities. To obtain for comparison a sufficient Northern colored population, the Northeast and North Central cities have been combined into one section which is here designated as the North. In these three sections practically all of the colored population are Negroes; the small number of colored in the Western section are omitted as they are largely of non-Negro stocks. Figure 3 shows for colored children the percentage who had been immunized against diphtheria and smallpox in each of these three sections. Comparison with white children will be made in a later section—these charts relate to geographic variation in immunizations among the colored (tables 7 and 8).

Diphtheria immunizations are far more frequent among colored children in Northern and Intermediate cities than in the South. In the preschool ages the Intermediate is above the North but after 6 years of age the reverse is true. In the percentage of colored children who reported a history of a case of diphtheria, the South was lowest, the North next, and the Intermediate was highest.

In smallpox vaccinations also the Southern Negro has lower percentages than Negroes in the North and Intermediate sections. The Intermediate group is highest in the school ages, reaching a maximum level of about 97 percent, but in the preschool ages the percentages vaccinated are less than in the North. In the percentage of colored children who had had a case of smallpox, the South is highest and the Intermediate is lowest.

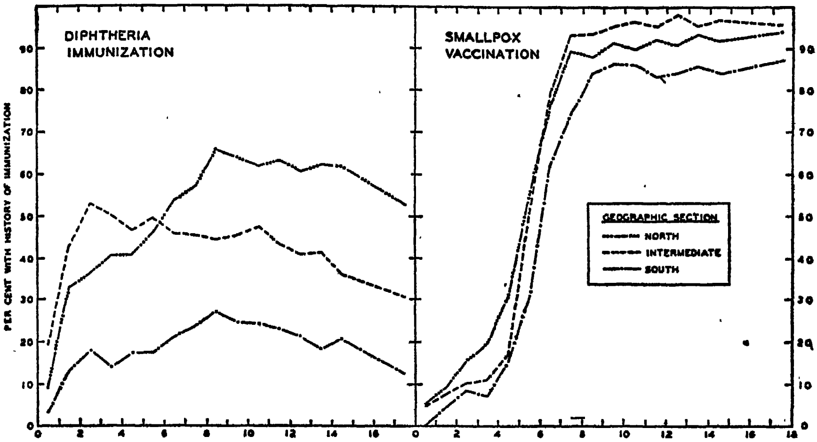

FIGURE 3.—History of immunization against diphtheria and smallpox at any time since birth among children of colored household heads in three geographic sections—canvassed families in 23 large cities in 15 States, 1935. (See footnote 1 to table 4 for definition of sections; North includes Northeast and North Central.)

TABLE 7.—*History of immunization against four communicable diseases at any time since birth among children* [1] *of colored household heads in three geographic sections* [2]*—canvassed families in 23 large cities in 15 States, 1935*

Age last birthday	Percentage with history of immunization but no case						Number of children observed (population)		
	North	Intermediate	South	North	Intermediate	South	North	Intermediate	South
	Diphtheria			Smallpox					
Under 1	8.8	19.1	3.6	5.2	4.9	----------	328	183	222
1	32.7	42.8	13.1	9.0	7.5	4.4	511	278	366
2	35.8	53.1	18.2	15.5	10.1	8.5	464	256	340
3	40.2	50.0	13.8	19.3	10.8	7.3	502	242	383
4	40.5	46.5	17.3	30.6	16.5	15.4	531	258	330
5	45.9	49.3	17.5	54.9	51.7	30.6	481	270	361
6	53.5	45.7	21.2	77.0	79.6	62.1	550	278	382
7	56.7	45.3	23.7	89.3	93.1	74.4	554	289	371
8	65.3	44.1	27.1	87.8	93.4	84.3	539	299	358
9	63.3	45.2	24.8	91.3	95.4	86.2	559	281	443
10	61.9	47.1	24.5	89.5	96.1	86.0	507	276	391
11	62.9	43.2	22.9	92.1	95.3	83.0	561	280	414
12	60.2	40.7	21.1	90.8	97.7	84.0	465	300	374
13	61.7	41.2	18.3	93.2	95.4	85.7	483	279	431
14	61.3	35.9	20.7	91.9	96.6	84.0	411	262	357
All under 15	51.2	43.7	19.7	64.3	65.7	56.1	7,446	4,031	5,523
Under 5	33.3	43.6	13.9	16.9	10.3	7.5	2,336	1,217	1,641
5–9	57.2	45.9	22.9	80.7	83.0	68.3	2,683	1,417	1,915
10–14	61.7	41.7	21.5	91.5	96.2	84.6	2,427	1,397	1,967
	Scarlet fever			Typhoid fever					
All under 15	2.29	1.09	0.42	0.86	0.86	3.19			
Under 5	1.20	.74	.18	.51	.16	.98			
5–9	2.84	1.12	.47	.97	1.05	3.15			
10–14	2.72	1.35	.56	1.06	1.28	5.57			

[1] Own, step, and adopted children of the household head.
[2] For definition of geographic sections, see footnote 1 to table 4; North as here used includes Northeast and North Central.

As among the white, scarlet fever immunizations among Negroes were more frequent in Northern than in Intermediate and particularly Southern cities. Percentages of Negroes who gave a history of an attack of the disease were smallest in the South and largest in the North.

In typhoid fever immunizations the Southern Negro was far above both the Intermediate and the Northern Negro; thus for the Negro also the South stands out as using typhoid fever immunization more than any other section. In the percentage of Negroes with a history of a typhoid case the South is highest and the North lowest.

TABLE 8.—*History of attack by four communicable diseases at any time since birth among children of colored, native white, and foreign-born white household heads in three geographic sections [1]—canvassed families in 28 large cities in 15 States, 1935*

Color and nativity of household head	North	Intermediate	South	North	Intermediate	South	North	Intermediate	South	North	Intermediate	South
	Diphtheria			Smallpox			Scarlet fever			Typhoid fever		
	Percentage [2] of children under 15 years of age with history of a case											
Colored	1.4	2.1	1.1	0.52	0.31	1.40	4.7	2.3	0.8	0.13	0.36	0.74
Native white	2.0	3.2	4.4	.25	.13	.60	9.2	7.8	4.9	.12	.15	.49
Foreign white	2.4	4.1	6.1	.28	.16	.72	6.2	6.5	3.4	.09	.06	------
	Number under 15 years with history of a case											
Colored	103	87	63	39	13	82	360	95	49	10	15	38
Native white	1,340	667	766	165	28	106	6,126	1,630	871	80	31	88
Foreign white	1,126	122	50	128	4	7	2,789	197	28	44	2	------

[1] For definition of geographic sections, see footnote 1 to table 4; North as here used includes Northeast and North Central.
[2] Percentages for children under 15 years of age in this table are simple averages of percentages for the three 5-year age groups under that age. See tables 5 and 7 for numbers of children observed.

V. RACIAL VARIATION

Comparison of the extent of immunization among three racial groups will be made first in the North where most of the foreign white stock live, and in the South where most of the Negro stock live.

Diphtheria.—In diphtheria the percentages immunized in the North are nearly the same for native white, foreign white, and colored children of the same ages. Figure 4 shows the data in single years of age (table 9). In the preschool ages the colored are somewhat above both native and foreign white children. Numbers of foreign children in the South are insufficient for this detail but the data are shown in 5-year age groups for native and foreign white in table 5 and for colored in table 7. In the preschool ages in the South, percentages of native and foreign white children immunized against diphtheria are about equal but the colored are very much less. In the two groups from 5 to 15 years in the South, the foreign and particularly the colored children are considerably below native white in the percentages immunized

against diphtheria. In the Intermediate group, native and foreign show roughly the same percentage immunized against diphtheria; in the school ages fewer Negroes have been immunized than in either white group. The presence of large groups of poorly immunized colored children in the South and Intermediate cities may be a factor in keeping the attack rate on a higher level than in the North.

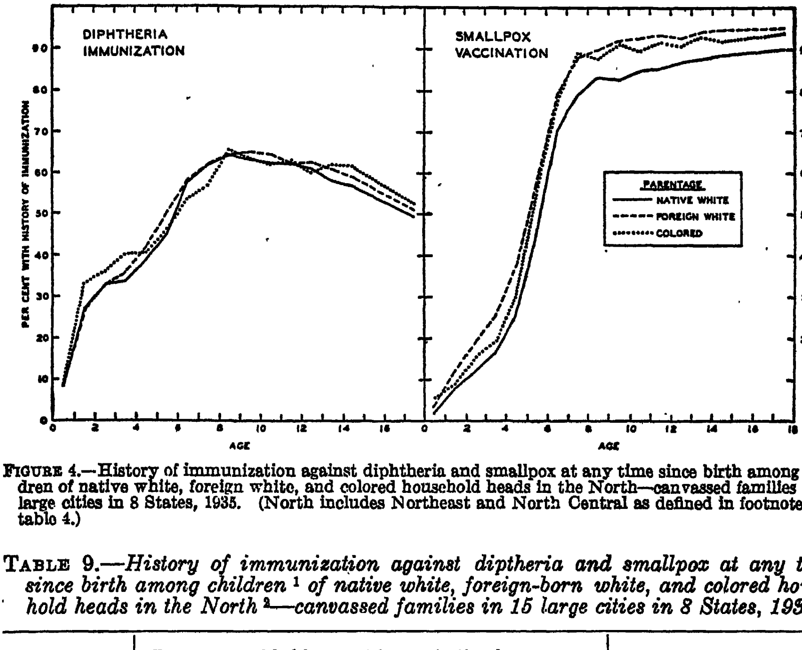

FIGURE 4.—History of immunization against diphtheria and smallpox at any time since birth among children of native white, foreign white, and colored household heads in the North—canvassed families in 15 large cities in 8 States, 1935. (North includes Northeast and North Central as defined in footnote 1 to table 4.)

TABLE 9.—*History of immunization against diptheria and smallpox at any time since birth among children* [1] *of native white, foreign-born white, and colored household heads in the North* [2]*—canvassed families in 15 large cities in 8 States, 1935*

Age last birthday	Percentage with history of immunization but no case						Number of children observed (population)		
	Diphtheria			Smallpox					
	Native white	Foreign white	Colored	Native white	Foreign white	Colored	Native white	Foreign white	Colored
Under 1	8.2	9.8	8.8	2.3	4.2	5.2	3,708	1,185	328
1	26.7	26.1	32.7	7.9	12.1	9.0	4,725	1,465	511
2	32.6	32.8	35.8	12.1	19.4	15.5	4,548	1,684	464
3	33.8	35.6	40.2	16.6	25.6	19.3	4,505	1,819	502
4	38.5	41.5	40.5	26.2	38.6	30.6	4,723	2,078	531
5	44.8	50.1	45.9	46.6	57.2	54.9	4,697	2,261	481
6	57.1	57.8	53.5	70.4	79.5	77.0	4,506	2,427	550
7	61.8	61.8	56.7	79.2	88.1	89.3	4,789	2,627	554
8	64.4	64.3	65.3	83.3	90.0	87.8	4,520	2,797	539
9	63.0	64.7	63.3	82.8	92.2	91.3	4,596	3,036	559
10	62.1	64.4	61.9	84.8	92.9	89.5	4,482	3,217	507
11	62.0	62.1	62.9	85.7	93.5	92.1	4,584	3,622	561
12	60.9	62.1	60.2	87.2	92.8	90.8	4,277	3,590	465
13	57.7	60.6	61.7	87.7	94.3	93.2	4,405	3,732	483
14	56.5	58.5	61.3	88.9	94.9	91.9	4,026	3,756	411
All under 15	49.0	54.7	51.2	57.6	75.0	64.3	67,091	39,296	7,446
Under 5	28.7	31.1	33.3	13.5	22.1	16.9	22,209	8,231	2,336
5-9	58.2	60.3	57.2	72.4	82.5	80.7	23,108	13,148	[illegible]
10-14	59.9	61.4	61.7	86.8	93.7	91.5	21,774	17,917	2,427

[1] Own, step, and adopted children of household head.
[2] North includes Northeast and North Central as defined in footnote 1 to table 4.

In all three regions the percentage of Negroes with a history of a case of diphtheria (table 8) is less than among either the native or foreign white in the same section. Diphtheria death rates are generally lower for colored than for white children (*21*) but there appears to be no difference in antitoxic immunity demonstrable by the Schick test (*6*). In all three regions native white children show somewhat smaller percentages with a history of a case than do the foreign white.

Smallpox.—In smallpox vaccinations in the North (fig. 4 and table 9), foreign white and colored show slightly larger percentages vaccinated than native white of the same ages; foreign white are slightly above colored in most of the ages. In the South, the foreign white are above native white in the groups under 10 years but roughly the same at 10–14 years. Colored are generally slightly below both white groups (tables 5 and 7).

In all three regions the percentage of Negroes with a history of a case of smallpox is larger than among either the native or foreign white in the same section. The differences between the native and foreign white are small in all three regions (table 8).

Scarlet fever.—In the South the Negroes show lower percentages immunized against scarlet fever than either white group, but in the Intermediate and Northern cities the differences are small (tables 5 and 7).

In all three regions the percentage of Negroes who reported a history of a case of scarlet fever is definitely less than among either the native or foreign white in the same section. The percentages for the native white are slightly larger than those for the foreign white in each section (table 8).

Typhoid fever.—In the South the native white show much higher percentages immunized against typhoid than either the foreign white or the Negroes (tables 5 and 7).

In typhoid case histories, the Negroes show higher percentages than either white group in the same region (table 8).

VI. VARIATION WITH FAMILY INCOME

The only index of economic status available in this study is the family informant's estimate of family income during the year preceding the canvass. No attempt was made to get exact figures but the informant was asked to indicate in which of several broad groups the income fell; if the family was or had been on public relief during the study year, the question about income was not asked.

Income during the study year seems an inappropriate measure to set against the percentage who had been immunized during many years. In many instances the family income may have changed a great deal during the life of the child. However, in the absence of a better index of economic status, the children were classified by this

current family income. Figure 5 affords a comparison for different income levels of the percentages of white children of three age groups who had been immunized against the four diseases (table 10).

Diphtheria.—Among children under 5 years, families on relief showed less than half as many immunized against diphtheria as in families with annual incomes of $3,000 or more. As income increases, the percentages immunized gradually increase. At the ages 5–9 and 10–14 the picture is the same except that: (*a*) relief families show slightly higher percentages of children immunized than nonrelief families with less than $1,000 annual income, and (*b*) the relative differences between the percentages immunized in the lowest and highest income groups are considerably less than among preschool children.

Smallpox.—In smallpox vaccinations among children under 5 years, relief families and the two lowest nonrelief income groups had about the same percentages vaccinated, which was less than half of the percentage for children in families with $3,000 or more annual income. In the 5–9 year group, there was a steady rise from relief to the highest income group, but the relative differences between percentages for the several income groups were small. Among children 10–14 years of age all income groups showed about the same percentages vaccinated. Figure 6 shows the data for diphtheria and smallpox in single years of age (table 11).

Scarlet fever.—Scarlet fever immunizations show rather large relative differences in the percentages immunized in the several income groups; percentages immunized in the highest income group were, in the three ages, from two and one-half to five times those in the lowest income group.

Typhoid fever.—The same large income differences appear for the percentages immunized against typhoid fever, the highest income group showing, in the three ages, percentages that are two and one-half to seven times those for the lowest income class.

Discussion of immunization differences.—Even in the highest income group less than 6 percent of the children had been immunized against typhoid and scarlet fevers. Thus, as already pointed out, immunizations against these diseases are largely a matter of individual initiative and ability to secure such service, rather than the result of any public program. In smallpox, particularly in the school ages, all economic levels get about the same percentage of vaccinations because the program is largely under public auspices. Diphtheria immunization in the school ages has some of the characteristics of both kinds of programs but tends to be, like smallpox vaccination, a matter of public service for all income groups. But even in smallpox and diphtheria the picture for children under 5 years is like that for scarlet and typhoid fevers where individual initiative and economic status are important factors in the percentages immunized.

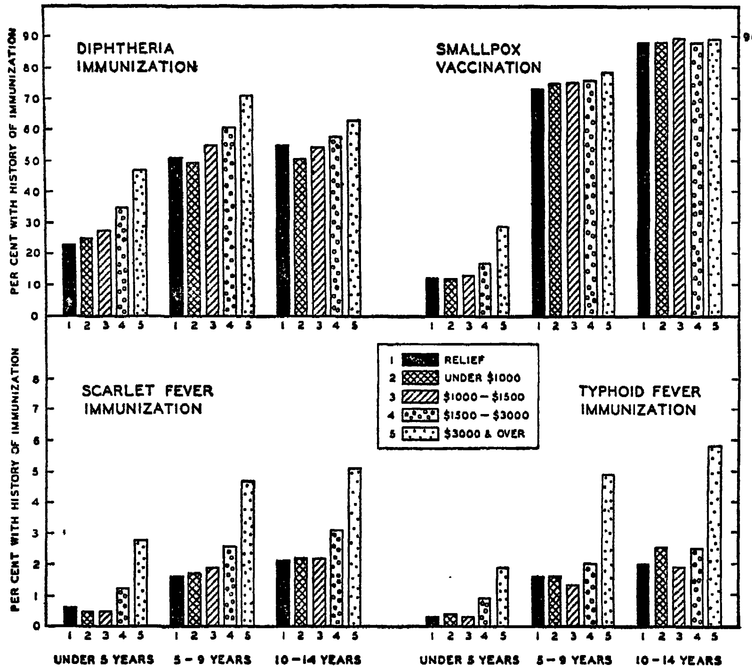

FIGURE 5.—History of immunization against four communicable diseases at any time since birth among children of certain age groups in families of different annual income levels at the time of the survey—canvassed white households in 28 large cities in 19 States, 1935.

TABLE 10.—*History of immunization against four communicable diseases at any time since birth among children of certain age groups in families of different income levels at the time of the survey—canvassed white households in 28 large cities in 19 States, 1935*

Annual family income	Age last birthday: All under 15	Under 5	5-9	10-14	All under 15	Under 5	5-9	10-14
	Percentage [1] with history of immunization but no case							
	Diphtheria				Smallpox			
Relief	44.4	23.0	51.1	55.0	61.1	12.4	73.3	88.0
Nonrelief:								
Under $1,000	42.7	25.0	49.7	50.6	61.1	12.1	74.6	88.0
$1,000-$1,499	46.3	27.6	54.7	54.5	61.3	12.9	75.3	89.2
$1,500-$2,999	52.7	35.4	60.8	57.9	64.7	17.2	76.0	88.1
$3,000 and over	62.2	47.7	71.3	63.3	70.9	29.2	78.5	89.0
	Scarlet fever				Typhoid fever			
Relief	1.49	.62	1.56	2.11	1.34	.27	1.58	1.96
Nonrelief:								
Under $1,000	1.52	.50	1.66	2.22	1.62	.42	1.64	2.54
$1,000-$1,499	1.58	.55	1.87	2.18	1.23	.35	1.31	1.91
$1,500-$2,999	2.41	1.20	2.63	3.07	1.89	.86	1.98	2.55
$3,000 and over	4.42	2.80	4.75	5.09	4.54	1.86	4.87	5.84

[1] See table 11 for number of children observed.

Although the data here presented are for all cities combined, percentages for the several geographic sections show approximately the same types of variation with income. The sections with lower immunization rates, such as smallpox vaccinations in the West and diphtheria immunizations in the South, show larger relative income differences in both the school and preschool ages than is true for sections with higher percentages immunized.

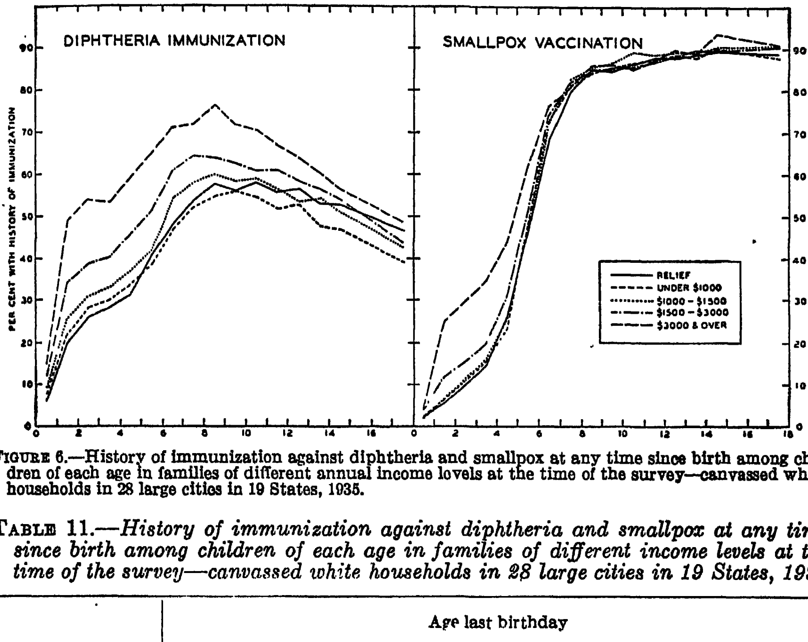

FIGURE 6.—History of immunization against diphtheria and smallpox at any time since birth among children of each age in families of different annual income levels at the time of the survey—canvassed white households in 28 large cities in 19 States, 1935.

TABLE 11.—*History of immunization against diphtheria and smallpox at any time since birth among children of each age in families of different income levels at the time of the survey—canvassed white households in 28 large cities in 19 States, 1935*

Annual family income	Age last birthday: Under 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Percentage with history of immunization but no case														
Diphtheria:															
Relief	5.9	19.8	25.8	28.1	31.0	40.3	47.6	53.5	57.5	55.6	57.8	55.5	56.2	52.7	52.6
Nonrelief:															
Under $1,000	7.1	22.2	27.9	29.9	33.7	38.2	46.8	52.0	54.7	55.8	54.0	51.5	52.7	47.9	46.9
$1,000–$1,499	7.9	25.4	30.8	32.7	36.6	42.0	54.3	57.9	59.9	58.3	58.7	56.2	53.3	53.5	50.9
$1,500–$2,999	11.9	34.2	38.6	40.3	45.4	51.1	60.9	64.3	64.0	62.5	60.6	60.9	58.1	56.2	53.9
$3,000 and over	14.8	48.7	54.0	53.1	59.0	65.2	71.2	72.0	76.3	71.7	70.2	66.7	63.9	60.4	56.3
Smallpox:															
Relief	2.1	5.8	9.9	14.7	26.4	45.9	68.7	79.7	85.1	84.6	86.5	87.7	87.7	88.7	89.4
Nonrelief:															
Under $1,000	2.3	6.3	10.6	15.4	23.3	47.6	72.8	81.3	83.9	85.5	86.4	87.4	88.4	87.9	90.0
$1,000–$1,499	1.7	6.6	11.1	16.1	25.8	46.8	72.8	82.8	85.5	86.7	89.2	88.5	89.1	88.9	90.3
$1,500–$2,999	3.6	11.6	15.3	19.9	30.8	51.2	74.3	81.5	84.8	85.4	85.7	87.3	88.4	89.7	89.4
$3,000 and over	4.3	25.0	29.8	34.7	43.7	61.9	76.5	81.0	85.5	86.2	85.1	87.3	89.5	88.7	93.7
	Number of children observed														
Population:															
Relief	1,454	1,887	1,861	1,948	1,949	2,024	2,024	2,227	2,195	2,196	2,318	2,447	2,267	2,388	2,207
Nonrelief:															
Under $1,000	1,328	1,688	1,634	1,641	1,771	1,734	1,751	1,798	1,904	1,847	1,990	2,115	1,979	2,104	1,934
$1,000–$1,499	2,401	3,032	3,007	2,950	3,246	3,052	3,263	3,288	3,243	3,332	3,367	3,565	3,373	3,439	3,450
$1,500–$2,999	2,208	2,802	2,838	2,967	3,159	3,244	3,318	3,610	3,536	3,766	3,722	3,930	3,920	4,168	3,949
$3,000 and over	256	300	313	358	378	422	444	453	427	484	493	586	512	583	567

Case histories.—In the instance of diphtheria and smallpox, the proportion of children under 15 years with a history of a case decreases slightly but regularly as family income increases (table 12). Children under 15 years of age in families with $3,000 or more annual income show 1.8 percent with a history of diphtheria, as compared with 2.7 percent for both relief and nonrelief families with less than $1,000 income. The corresponding figures for smallpox are 0.23 percent for $3,000 or over as compared with 0.58 percent for nonrelief under $1,000 and 0.56 percent for relief families. In scarlet and typhoid fevers there was no regular trend with income in the percentage of children with a history of a case.

TABLE 12.—*History of attack by four communicable diseases at any time since birth among children in families of different income levels at the time of the survey—canvassed white households in 28 large cities in 19 States, 1935*

Income during survey year	Percentage [1] of children under 15 years of age with history of a case				Number under 15 years with history of a case			
	Diphtheria	Smallpox	Scarlet fever	Typhoid fever	Diphtheria	Smallpox	Scarlet fever	Typhoid fever
Relief	2.7	.56	7.0	.17	894	192	2,317	58
Nonrelief:								
Under $1,000	2.7	.58	6.6	.22	763	167	1,896	64
$1,000–$1,499	2.5	.38	7.0	.15	1,261	190	3,478	76
$1,500–$2,999	2.3	.32	8.3	.12	1,287	182	4,567	72
$3,000 and over	1.8	.23	7.3	.24	137	18	536	18

[1] Percentages for children under 15 years of age in this table are simple averages of percentages for the three 5-year age groups under that age. See table 11 for numbers of children observed.

VII. COMPARISON WITH OTHER SURVEYS AND REPORTS

Special surveys.—Techniques, procedures, schedules, and personnel vary so much from one survey to another that it is seldom possible to make comparisons that can be interpreted as representing trend from the time of one survey to that of another. However, there are two preceding surveys that are rather similar in procedures, methods, and tabulations. The first, 1928–30, is based on surveys by the Committee on the Costs of Medical Care (*11, 12, 13, 14, 15*) and the second, 1931, is a report from the White House Conference on Child Health and Protection (*29, 30*). The Medical Care data are based on 6,404 persons under 20 years of age in 21 cities of 100,000 or more population. The White House report is based on 145,720 children under 6 years of age in 156 cities of 50,000 or more population. In comparing the results of the three surveys, it must be kept in mind that each study is based on a different sample which in no two cases includes the same group of cities although individual cities are included in all three studies. Nevertheless each survey represents a group of metropolitan areas and it seems feasible to make some rough comparison of percentages immunized at the three periods. The data for smallpox and diphtheria immunizations are shown in table 13 in rather detailed ages. Table 14 shows in broader age groups similar

TABLE 13.—*History of immunization against diphtheria and smallpox at any time since birth among children*[1] *in large cities according to surveys*[2] *in 1928–30, 1931, and 1935–36*

Midyear of survey	Age last birthday									
	Under 1	1	2	3	4	5	6–7	8–9	10–14	15–19
	Percentage with history of immunization but no case									
Diphtheria:										
1929	4.5	11.0	14.3	15.4	24.3	29.2	36.2	34.8	29.2	10.5
1931	3.3	16.5	22.1	24.1	27.0	31.8	----	----	----	----
1935	8.8	27.2	32.6	34.5	38.6	44.9	56.7	59.9	55.4	43.5
Smallpox:										
1929	4.8	11.3	19.3	18.5	30.4	42.8	74.6	80.9	84.0	84.9
1931	3.4	11.1	16.7	20.8	28.4	43.8	----	----	----	----
1935	2.5	8.5	12.8	17.6	27.6	48.8	77.2	85.3	88.4	89.7
	Number of children observed (population)									
Population:										
1929	333	344	383	364	375	383	838	772	1,577	1,035
1931	24,268	19,015	25,104	26,318	26,190	24,825	----	----	----	----
1935	7,687	9,768	9,715	9,924	10,578	10,551	22,355	23,099	61,816	59,862

[1] The 1929 and 1935 data are for white children; the 1931 data are for white and colored combined.

[2] Data for 1929 are from survey by the Committee on the Costs of Medical Care (*11, 13*) (collected as of the beginning of the survey year) in 21 cities of more than 100,000 population distributed geographically as follows: *Northeast:* Lynn, Worcester, New Haven, New York, Yonkers; *North Central:* Chicago, Canton, Cleveland, Dayton, Detroit, Fort Wayne, Wichita; *South:* Washington, D. C., Richmond, Atlanta; *West:* Denver, Los Angeles, San Diego, San Francisco, Seattle, Tacoma.

Data for 1931 are from a White House Conference Report (*29*) on immunizations among preschool children in 156 cities (mostly over 50,000 population) in 45 States. The cities included in the survey are listed in the report.

Data for 1935 are from the present survey of 28 cities of more than 100,000 population. See note 1 to table 4 for geographic distribution of these cities.

TABLE 14.—*History of immunization against certain communicable diseases at any time since birth among white children in four geographic sections according to surveys*[1] *of large cities in 1928–30 and 1935–36*

Geographic section[1] and midyear of survey	Age last birthday											
	Under 5	5–9	10–14	15–19	Under 5	5–9	10–14	15–19	Under 5	5–9	10–14	15–19
	Percentage with history of immunization but no case								Number of children observed (population)			
	Diphtheria				Smallpox							
All sections:												
1929	14.2	34.3	29.2	10.5	17.3	70.9	84.0	84.9	1,799	1,993	1,577	1,035
1935	29.4	55.8	55.4	43.5	14.6	75.2	88.4	89.7	47,672	56,005	61,816	59,862
Northeast:												
1929	26.5	35.3	36.2	19.3	51.6	87.7	88.0	87.8	313	424	359	238
1935	25.9	57.0	61.0	52.3	18.8	86.8	96.0	96.0	17,863	20,926	23,530	22,820
North Central:												
1929	11.6	35.0	28.7	7.8	7.4	66.1	86.3	88.3	893	947	724	436
1935	33.2	60.9	59.7	45.5	11.8	62.2	81.5	87.3	13,664	16,269	17,215	17,441
South:[1]												
1929	15.5	36.5	25.8	8.6	8.5	73.2	78.9	82.7	269	306	252	151
1935	36.5	51.5	42.8	27.5	12.4	83.6	94.1	93.5	11,641	14,030	15,406	13,912
West:												
1929	8.4	28.8	23.6	7.2	18.6	60.7	76.4	76.1	324	316	242	210
1935	12.9	45.6	53.1	40.8	11.6	44.0	62.5	62.8	4,504	4,780	5,665	5,689
	Scarlet fever				Typhoid fever							
All sections:												
1929	2.7	3.8	3.7	1.3	.2	1.2	2.9	6.2				
1935	.8	2.1	2.6	2.3	.6	1.8	2.4	2.9				

[1] For sources of the 1929 data and cities included in each geographic section, see note 2 to table 13. The 1935 data are from the present study and are classified geographically as indicated by note 1 to table 4, except that Intermediate and South are here combined into the one group designated as South.

data for large cities in each of four broad geographic sections, together with data on scarlet and typhoid fever immunizations for all cities combined; the numbers involved in these latter categories are too small for comparisons by geographic section.

The proportion of children immunized against diphtheria appears to have increased rather markedly in practically every age group in every section. In 1929, about 36 percent of the 6- and 7-year-old and 35 percent of 8- and 9-year-old children had been immunized; but in 1935 these proportions were 57 and 60 percent for the respective age groups. The increase among 15- to 19-year-olds from 10 percent in 1929 to 43 percent in 1935 presumably represents largely the increasing age of children immunized when they were younger, rather than more immunizations done when the children were above 15 years of age.

The data on smallpox vaccinations for all sections combined indicate slight increases in 1935 over 1929 for children over 5 years, but the reverse for preschool children. Considered by sections, the results are not consistent and, with the small numbers of varying individual cities, it is not possible to say whether any real changes took place between the two surveys.

Scarlet fever immunizations were somewhat less frequent in 1935 than in 1929 in three of the four age groups. Apparently the level of scarlet fever immunization has not increased materially in recent years.

The few data on typhoid immunizations indicate little if any difference in the proportions immunized in the two periods. This is true of the South where most of the typhoid immunizations were found in both surveys, as well as for all sections combined.

A few results of recent surveys made by city health departments may be cited without any implication that other cities have done worse or better in promoting diphtheria immunization. In Detroit the proportion of children entering school (presumably 5- to 6-year-olds) who had already been immunized against diphtheria rose from 66 percent for 1936 to 70 percent for 1941 (*23*). Sample surveys of preschool children were made by the Cleveland Health Department in 1934 and 1939; during that period the proportion of 5-year-old children who had been immunized against diphtheria increased from 43 to 66 percent (*24*).

Baltimore Health Department reports show for each year the number of children of different ages who have been immunized at any time since its campaign first began. It also shows estimates, based on these data, of the percentage of children who have been immunized. Of all children under 5 years of age at the close of 1935, 45 percent were immunized against diphtheria, as compared with 80 percent at

the close of 1941; corresponding figures for ages 5–9 were 53 percent for 1935 and 95 percent for 1941 (*25*).

If one neglects migration, the number of live births to resident mothers (minus infant deaths) gives a rough index of the new unimmunized children who are added to the population each year. If at the beginning of the year 50 percent of the children under 15 years of age had been immunized, then the number of immunizations during the year must equal about half of the births to maintain the 50 percent level; this statement assumes that practically all of the immunizations are done for children under 15 years of age and that 14-year-olds who become 15 are also roughly 50 percent immunized. Thus to accomplish the increase noted in Baltimore, 15,000 to 19,000 immunizations were done annually during the 6 years 1936–41, as compared with about 13,000 births annually.

Health department reports.—Data on the number of smallpox vaccinations reported since 1937 to the United States Children's Bureau (*37*) by State health departments throughout the country vary from a low of 1,097,000 in 1937 to highs of 1,687,000 in 1938 and 1,472,000 in 1939, back to 1,170,000 in 1940 and 1,243,000 in 1941. A considerable but unknown number of these vaccinations would be of adults with a rather large percentage representing revaccinations. Thus it is not practicable to say whether the level of vaccination was raised during this period.

Sample surveys in Detroit indicate that the proportion of children entering school (presumably 5- and 6-year-olds) who had already been vaccinated against smallpox rose from 41 percent in 1936 to 54 percent in 1941. Thus it appears that at least in Detroit vaccinations are being done at earlier ages. However, this does not necessarily mean a higher maximum level of smallpox vaccinations which in large cities reaches 90 percent or above at about 15 years of age.

The indications of more diphtheria immunizations in the 1936 survey than in that of 1929 and common knowledge of the immunization activities of health departments both suggest that more children are now immunized than at the time of this survey. However, the number of diphtheria immunizations reported to the United States Children's Bureau (*37*) by State health departments do not indicate large increases since 1937; the figure for 1941 was 1,075,000 as compared with 1,102,000 and 1,067,000 for 1940 and 1939, respectively. The number in 1938 of 1,177,000 was the highest and 897,000 in 1937 was the lowest reported in the 5 years of record. But the maintenance of a constant number of annual immunizations for a short period does not necessarily mean that the percentage of children immunized also remains constant. The annual number of immunizations may be sufficient to increase the percentage immunized, or it may be insuffi-

cient to maintain the level of the beginning of the period. According to the present study 48 percent of children under 15 years of age covered by the survey had been immunized in 1935. If one can assume that the reports to the Children's Bureau during the 5 years 1937–41 were reasonably complete and that they refer to children immunized and not to the number of injections of toxoid, the number of children immunized amounts to about half of the number of children born during that period who lived through the first year of life. Thus if the level of immunizations in the surveyed cities was roughly the same as in the country as a whole, the reported immunizations about maintained the level as found by the present survey. If, as seems probable, the level in small cities and rural areas was less than in the large surveyed cities, the reported immunizations raised the level of diphtheria immunizations since 1936.

For the group of white children under 15 years of age who were covered by the survey, the percentage who had been immunized against diphtheria varied in the 28 surveyed cities from 70 to 17 percent in 1935. In a few individual cities in different geographic sections, the numbers of immunizations and births may be compared, without any implication that the cities cited are representative of others in the section. A Northeastern city with 60 percent of the children under 15 years immunized against diphtheria in 1935 has about 2,900 births per year; during the 6 years 1935–40 an average of about 2,700 immunizations were done annually. If 60 percent as many children were immunized as came into the population by birth, or about 1,700, the 1935 level of immunizations would have been maintained, so the 2,700 per year would raise the level considerably. A Western city with 1,800 annual births did an average of 1,800 immunizations during the 7 years 1935–41. Since only 37 percent of children under 15 years in this city were immunized in 1935, the 1,800 per year would be between two and three times the number needed to maintain the 1935 level. A Southern city with about 2,900 births per year reported nearly 3,100 annual diphtheria immunizations during the 6 years 1936–41. Since only 57 percent of the children under 15 years had been immunized in 1935, this number of immunizations was about twice the number needed to maintain the 1935 level. Another Southern city with about 6,800 annual births reported an average of 2,600 annual diphtheria immunizations during the 7 years 1935–41. Since only 28 percent of the children under 15 years were immunized in 1935, these 2,600 immunizations were sufficient to raise the 1935 level.

These rough comparisons of the numbers of diphtheria immunizations and births indicate that most of the cities have raised the level of immunization since the survey, but in many cases it would

still be low; the survey results, therefore, represent minimal percentages immunized for diphtheria.

VIII. SUMMARY

This study of immunizations is based on a canvass of 213,931 households in 28 cities of 100,000 or more population selected as representative of cities of that size in different geographic sections. The data which were collected during the 3 months ended about the middle of June 1936, included histories for each person under 25 years of age for artificial immunization against or attack by diphtheria, smallpox, scarlet fever, and typhoid fever. A comparison of certain characteristics of the surveyed population with census data indicates that it is fairly representative of the population of cities with 100,000 or more inhabitants.

Immunizations against scarlet and typhoid fever are negligible in frequency as compared with those against diphtheria and smallpox. In the preschool ages diphtheria immunizations are more frequent than smallpox vaccinations, but after 5 years the reverse is true. At 8 years of age 61 percent of the children had been immunized against diphtheria and 85 percent had been vaccinated against smallpox at some time since birth.

There is considerable geographic variation in the extent of immunization against these diseases. These 28 large cities were divided into 5 geographic groups, Northeast, North Central, Intermediate, South, and West. In diphtheria immunizations the West is lowest from birth through 7 years but beyond that age the South is lowest; the Intermediate is highest from birth through 5 years, but after 6 years the Northeast and North Central are above the Intermediate. The South and Intermediate cities are highest in history of diphtheria cases.

In smallpox vaccinations the Northeast, Intermediate, and South all get above 90 percent by about 8 years of age, but the North Central and particularly the West are low, the latter reaching only about 60 percent. In history of smallpox cases the West is above any other section.

In scarlet fever immunizations the West and North Central are far above the other sections, but no region gets above about 5 percent. In scarlet fever cases the North Central and Intermediate are at the top. In typhoid immunizations the South is far above any other section, with the West second. The South shows the highest history of typhoid cases. The numbers of scarlet fever and typhoid immunizations are too few in any section to have any definite effect upon the course of these diseases; the immunized, therefore, represent protection for certain individuals only, and the highest immunization rates

show up where case rates are high enough to stimulate the use of the vaccine.

An examination of the geographic variation in immunizations among children of native and foreign-born white parents and among colored indicates that all three of these racial elements of the population show the same general type of geographic variation in the extent of immunizations.

In the North the percentages of native, foreign, and colored children of specific ages who have been immunized against diphtheria are approximately the same; in the South, a higher percentage of the native whites are immunized than is true of the foreign white or the colored.

The only index of economic status available was the income of the family during the year preceding the canvass and this would not necessarily represent income during the child's life. Nevertheless, when children were classified according to that income, it was found that in the preschool ages the percentages of children who had been immunized against diphtheria and smallpox increase definitely with income. The same was true for diphtheria immunizations during the school ages, but there was little difference in smallpox vaccinations as between high and low incomes. Scarlet and typhoid fever immunizations increase with income in each of the three age groups under 15 years, indicating that these immunizations are largely the result of individual initiative rather than public programs.

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DEATHS DURING WEEK ENDED JULY 10, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 10, 1943	Corresponding week, 1942
Data from 88 large cities of the United States:		
Total deaths	7,7[illegible]5	7,554
Average for 3 prior years	7,775	
Total deaths, first 27 weeks of year	256,441	231,992
Deaths under 1 year of age	599	537
Average for 3 prior years	525	
Deaths under 1 year of age, first 27 weeks of year	17,720	14,949
Data from industrial insurance companies:		
Policies in force	65,598,856	65,388,272
Number of death claims	10,039	10,268
Death claims per 1,000 policies in force, annual rate	8.0	8.2
Death claims per 1,000 policies, first 27 weeks of year, annual rate	10.2	9.7

COURT DECISION ON PUBLIC HEALTH

Unwholesome food—sale.—(Massachusetts Supreme Judicial Court; *Commonwealth* v. *Economy Grocery Stores Corporation*, 46 N.E.2d 521; decided January 26, 1943.) A Massachusetts statute (Annotated Laws, chapter 94, section 150) prohibited the sale or offering for sale for food of "any diseased animal or product thereof or any tainted, diseased, corrupt, decayed or unwholesome carcass, meat, vegetable, produce, fruit or provisions of any kind, except when packed in such a container that upon reasonable inspection the condition of the contents thereof can not be ascertained, without making the condition of the thing sold or offered for sale fully known to the buyer." Regarding this statute the Supreme Court of Massachusetts took the view that the intention was to punish the sale of unwholesome provisions, subject to the statutory exception, without regard to the question whether the seller knew the provisions to be unwholesome or not. The offense under the statute was one in which guilty knowledge did not need to be alleged or proved.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 17, 1943

Summary

The rise in the incidence of poliomyelitis continued. A total of 297 cases was reported for the week, as compared with 245 for the preceding week and a 5-year (1938–42) median of 101. Of the current total, 231 cases, or 78 percent, were reported in the same 3 States which reported 85 percent of the cases last week, as follows (last week's figures in parentheses): Texas, 102 (90); California, 90 (75); Oklahoma, 39 (44). New York reported 11 cases (last week 5), and Kansas and Arkansas 7 each. For the first 28 weeks of the year 1,626 cases have been reported, as compared with 751 last year and 948 for the 5-year median. The cumulative figure to date this year is more than that for the corresponding per od of any year since 1934, when 2,694 cases had been reported.

A total of 264 cases of meningococcus meningitis was reported, as compared with 267 for the preceding week and a 5-year median of 35. Slight increases over the preceding week's figures were recorded for five of the nine geographic sections, namely, Middle Atlantic, East North Central, West North Central, East South Central, and West South Central. The cumulative total to date this year is 12,542 cases, as compared with 2,143 in 1942 and a 5-year median of 1,276.

Increases occurred, as compared with reports for the preceding week, in the incidence of diphtheria, typhoid fever, and whooping cough, and decreases in influenza, measles, scarlet fever, and smallpox. Of the nine diseases mentioned above, the incidence of only three—scarlet fever, smallpox, and typhoid fever—was below the 5-year medians.

Totals for the week for the other diseases included in the table are as follows (figures for the corresponding week of last year in parentheses): Anthrax, 2 (6); dysentery, all forms, 1,089 (784); infectious encephalitis, 17 (13); leprosy, 1 (0); Rocky Mountain spotted fever, 19 (17); tularemia, 19 (27); endemic typhus fever, 123 (58).

Deaths registered in 88 large cities of the United States for the week aggregated 7,782, as compared with 7,593 for the preceding week and a 3-year (1940–42) average of 7,342. The cumulative total for the first 28 weeks of the year is 259,350, as compared with 235,281 for the corresponding period of 1942.

Telegraphic morbidity reports from State health officers for the week ended July 17, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	July 17, 1943	July 18, 1942		July 17, 1943	July 18, 1942		July 17, 1943	July 18, 1942		July 17, 1943	July 18, 1942	
NEW ENGLAND												
Maine	1	0	1	-----	-----	-----	87	36	50	4	2	0
New Hampshire	0	0	0	-----	-----	-----	4	3	3	0	0	0
Vermont	1	0	0	-----	-----	-----	37	71	48	0	0	0
Massachusetts	1	8	4	-----	-----	-----	328	232	410	20	4	1
Rhode Island	0	2	1	-----	-----	-----	38	41	41	1	2	0
Connecticut	1	0	0	1	-----	1	66	75	75	5	2	0
MIDDLE ATLANTIC												
New York	6	9	15	[1] 4	[1] 3	[1] 3	951	368	840	33	9	2
New Jersey	3	5	7	1	2	2	760	170	170	8	2	0
Pennsylvania	10	12	12	-----	1	-----	211	121	245	21	6	3
EAST NORTH CENTRAL												
Ohio	7	4	6	2	12	6	154	64	77	17	0	1
Indiana	2	3	3	4	1	5	49	16	10	2	0	0
Illinois	7	14	17	6	9	6	342	51	91	10	1	1
Michigan [2]	3	2	4	2	1	1	653	42	370	8	1	1
Wisconsin	7	0	1	10	12	12	593	352	606	4	0	0
WEST NORTH CENTRAL												
Minnesota	1	0	1	1	1	1	180	54	29	3	0	0
Iowa	1	0	2	-----	-----	1	39	45	55	6	0	0
Missouri	1	0	1	-----	1	-----	37	31	15	8	7	1
North Dakota	3	1	1	-----	-----	-----	82	9	9	3	1	0
South Dakota	2	1	1	-----	-----	-----	24	8	7	0	0	0
Nebraska	1	2	1	-----	5	-----	12	55	13	0	0	0
Kansas	2	2	2	-----	3	1	55	33	33	4	0	0
SOUTH ATLANTIC												
Delaware	1	0	0	-----	-----	-----	6	1	1	1	0	0
Maryland [2]	1	1	1	-----	1	1	64	40	27	9	2	1
Dist. of Col.	1	2	5	-----	-----	-----	33	13	13	2	1	0
Virginia	1	5	5	42	76	26	74	24	65	8	2	2
West Virginia	3	2	2	-----	1	4	27	23	23	1	1	1
North Carolina	12	4	4	5	-----	-----	61	31	82	10	0	1
South Carolina	0	8	6	121	67	84	10	8	8	7	1	1
Georgia	3	4	4	16	7	7	23	20	15	4	1	0
Florida	4	2	2	18	4	4	13	34	16	5	1	1
EAST SOUTH CENTRAL												
Kentucky	6	0	1	3	-----	-----	10	8	15	6	3	2
Tennessee	5	2	2	4	4	13	38	15	22	2	0	1
Alabama	5	4	5	7	3	7	30	16	23	2	3	2
Mississippi [2]	2	6	3	-----	-----	-----	-----	-----	-----	5	2	1
WEST SOUTH CENTRAL												
Arkansas	3	4	4	10	2	2	11	12	23	1	0	1
Louisiana	3	2	4	9	4	10	11	11	6	3	1	1
Oklahoma	5	3	3	7	10	10	10	2	20	0	0	0
Texas	23	13	13	300	106	91	118	52	80	11	3	1
MOUNTAIN												
Montana	0	0	0	-----	4	-----	45	31	29	0	0	0
Idaho	0	1	1	-----	-----	-----	3	2	3	0	0	0
Wyoming	0	0	0	4	13	-----	17	34	12	2	0	0
Colorado	4	1	5	-----	34	-----	33	40	30	0	1	0
New Mexico	0	0	0	1	1	-----	2	2	8	0	0	0
Arizona	3	0	0	42	9	18	15	42	37	1	0	0
Utah [2]	0	0	0	-----	-----	-----	20	169	69	2	1	0
Nevada	0	0	-----	-----	-----	-----	26	5	-----	0	1	-----
PACIFIC												
Washington	8	0	0	-----	-----	-----	74	188	48	8	0	0
Oregon	10	2	1	4	6	6	58	43	35	4	0	0
California	19	10	12	19	28	17	324	512	397	13	2	1
Total	182	141	152	643	431	431	5,858	3,255	4,840	264	63	35
28 weeks	6,446	6,628	8,050	78,893	78,995	150,230	523,593	458,682	458,682	12,542	2,143	1,276

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 17, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis: Week ended— July 17, 1943	Poliomyelitis: Week ended— July 18, 1942	Poliomyelitis: Median 1938–42	Scarlet fever: Week ended— July 17, 1943	Scarlet fever: Week ended— July 18, 1942	Scarlet fever: Median 1938–42	Smallpox: Week ended— July 17, 1943	Smallpox: Week ended— July 18, 1942	Smallpox: Median 1938–42	Typhoid and paratyphoid fever: Week ended— July 17, 1943	Typhoid and paratyphoid fever: Week ended— July 18, 1942	Typhoid and paratyphoid fever: Median 1938–42
NEW ENGLAND												
Maine	2	3	0	9	0	3	0	0	0	1	1	1
New Hampshire	0	0	0	3	4	1	0	0	0	0	0	0
Vermont	0	0	0	0	5	3	0	0	0	0	0	0
Massachusetts	0	2	1	92	85	66	0	0	0	5	2	2
Rhode Island	1	0	0	5	2	2	0	0	0	1	0	0
Connecticut	3	0	0	21	2	13	0	0	0	0	3	3
MIDDLE ATLANTIC												
New York	11	3	2	89	79	113	0	0	0	6	12	12
New Jersey	0	2	2	22	30	31	0	0	0	2	1	2
Pennsylvania	3	0	0	44	92	98	0	0	0	9	9	9
EAST NORTH CENTRAL												
Ohio	0	3	3	57	67	67	0	0	0	12	13	8
Indiana	0	3	1	17	10	18	0	1	1	7	0	7
Illinois	2	6	5	53	71	87	0	0	3	5	3	12
Michigan [2]	2	4	4	33	37	85	0	1	1	5	2	2
Wisconsin	0	0	0	43	34	42	0	0	0	3	4	1
WEST NORTH CENTRAL												
Minnesota	2	0	1	16	27	24	0	1	1	0	1	1
Iowa	2	2	2	10	7	13	0	0	6	1	5	2
Missouri	4	6	1	11	13	13	0	0	1	7	6	6
North Dakota	0	0	0	2	3	3	0	0	2	0	1	1
South Dakota	0	0	0	5	4	4	0	2	4	6	1	0
Nebraska	0	0	0	2	7	5	0	1	1	1	0	0
Kansas	7	1	0	14	19	19	0	0	0	2	2	1
SOUTH ATLANTIC												
Delaware	0	0	0	1	3	3	0	0	0	0	0	1
Maryland [2]	1	0	0	17	11	11	0	0	0	0	4	4
Dist. of Col	0	1	0	4	12	3	0	0	0	2	1	1
Virginia	1	1	1	11	6	8	0	0	0	6	7	8
West Virginia	0	0	0	3	12	12	0	0	0	8	8	5
North Carolina	1	1	1	22	8	9	0	0	0	5	12	12
South Carolina	0	0	3	2	3	1	0	0	0	8	4	10
Georgia	1	2	2	0	1	4	0	0	0	8	19	19
Florida	2	0	1	1	4	2	0	0	0	2	7	4
EAST SOUTH CENTRAL												
Kentucky	0	17	3	7	16	14	0	2	0	11	15	15
Tennessee	0	5	2	17	12	12	0	7	0	14	15	15
Alabama	3	3	3	8	12	10	0	0	0	7	10	10
Mississippi [2]	2	0	0	3	2	2	0	0	0	8	11	9
WEST SOUTH CENTRAL												
Arkansas	7	11	1	6	3	3	0	1	0	15	14	14
Louisiana	0	1	1	4	5	5	0	0	0	5	11	21
Oklahoma	39	0	1	3	10	10	0	0	0	10	6	17
Texas	102	1	1	26	14	14	0	0	0	25	27	30
MOUNTAIN												
Montana	0	0	0	8	3	8	0	0	0	0	0	1
Idaho	0	0	0	2	0	2	0	0	0	1	1	1
Wyoming	0	0	0	15	5	3	0	0	0	1	2	0
Colorado	1	0	0	25	9	9	0	0	1	0	2	2
New Mexico	1	1	1	3	3	3	0	0	0	0	4	3
Arizona	3	0	0	9	1	1	0	0	0	1	0	3
Utah [2]	2	0	0	7	5	4	0	0	0	0	0	0
Nevada	2	1	------	1	0	------	0	0	------	0	1	------
PACIFIC												
Washington	0	0	0	13	14	14	1	0	1	0	2	2
Oregon	0	0	0	11	6	5	0	0	1	0	0	1
California	90	3	8	69	53	58	0	0	0	3	5	5
Total	297	83	101	846	831	956	1	16	40	207	254	254
28 weeks	1,626	751	948	93,978	85,950	112,675	584	593	1,843	2,160	2,847	3,099

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 17, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough, Week ended— July 17, 1943	Whooping cough, Week ended— July 18, 1942	Whooping cough, Median 1938–42	Week ended July 17, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	20	21	21	0	0	0	0	1	0	0	0	0
New Hampshire	7	3	0	0	0	0	0	0	0	0	0	0
Vermont	9	57	36	0	0	0	0	0	0	0	0	0
Massachusetts	75	105	116	0	0	1	0	1	0	0	1	0
Rhode Island	19	6	12	0	0	0	0	0	0	0	0	0
Connecticut	16	54	54	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	236	393	393	0	0	10	0	0	0	1	0	0
New Jersey	221	353	239	0	1	0	0	0	0	1	0	0
Pennsylvania	265	235	334	2	0	0	0	0	0	0	0	1
EAST NORTH CENTRAL												
Ohio	223	224	270	0	0	3	0	0	0	0	1	0
Indiana	68	51	30	0	0	0	0	0	0	0	0	0
Illinois	207	310	310	0	0	0	0	1	1	1	1	0
Michigan [2]	250	198	261	0	0	3	0	0	0	0	0	0
Wisconsin	262	208	208	0	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	64	71	66	0	0	0	0	0	0	0	1	0
Iowa	53	44	34	0	0	0	0	0	0	0	0	0
Missouri	53	21	36	0	0	0	0	2	0	0	0	0
North Dakota	25	0	20	0	0	0	0	0	0	0	0	0
South Dakota	12	1	3	0	0	0	0	0	0	0	0	0
Nebraska	24	25	20	0	0	0	0	0	0	0	0	0
Kansas	92	63	63	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	2	2	7	0	0	0	0	0	0	2	0	0
Maryland [2]	102	35	65	0	0	0	9	0	0	4	0	0
Dist. of Col.	32	15	13	0	0	0	0	0	0	[3] 0	0	0
Virginia	148	40	58	0	0	0	373	0	0	3	1	1
West Virginia	109	35	38	0	0	0	0	0	0	0	0	1
North Carolina	226	87	229	0	2	0	0	0	0	3	0	2
South Carolina	101	42	42	0	0	0	0	0	0	0	0	4
Georgia	79	49	26	0	1	16	0	0	0	0	3	40
Florida	13	29	13	0	2	0	0	0	0	0	0	15
EAST SOUTH CENTRAL												
Kentucky	25	72	64	0	0	0	2	0	0	0	0	0
Tennessee	55	40	56	0	0	0	27	0	0	0	3	1
Alabama	96	42	26	0	0	0	0	1	0	0	1	8
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	1
WEST SOUTH CENTRAL												
Arkansas	25	52	18	0	0	33	0	0	0	0	0	0
Louisiana	5	12	64	0	0	11	0	0	0	0	3	2
Oklahoma	28	5	19	0	0	0	0	0	0	0	0	0
Texas	411	187	203	0	42	503	0	0	0	0	1	47
MOUNTAIN												
Montana	25	16	10	0	0	0	0	0	0	0	1	0
Idaho	0	15	14	0	0	0	0	0	0	0	0	0
Wyoming	0	4	5	0	0	0	0	0	0	3	1	0
Colorado	35	38	38	0	1	0	0	0	0	0	0	0
New Mexico	10	26	18	0	0	4	0	0	0	0	0	0
Arizona	30	14	14	0	0	0	26	0	0	0	0	0
Utah [2]	95	28	76	0	0	0	0	0	0	1	1	0
Nevada	0	3	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	83	52	62	0	0	0	0	0	0	0	0	0
Oregon	54	27	27	0	0	0	0	0	0	0	0	0
California	195	190	242	0	3	15	0	10	0	0	0	0
Total	4,185	3,699	4,078	2	53	599	437	17	1	[3] 19	19	123
28 weeks	113,876	105,735	109,344	37	1,048	7,509	2,602	323	16	223	518	1,507
28 weeks, 1942	-------	-------	-------	50	550	4,039	2,668	246	32	244	553	1,130

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Exclusive of delayed report from the District of Columbia of 1 case for the week ended June 26.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 3, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	57	2	1	0	0	0	0	3
New Hampshire:												
Concord	0	0	------	0	2	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	2	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	87	6	14	0	72	0	1	20
Fall River	0	0	------	0	22	1	0	0	1	0	0	2
Springfield	0	1	------	0	1	0	1	0	8	0	0	3
Worcester	0	0	------	0	0	0	2	0	5	0	0	10
Rhode Island:												
Providence	0	0	------	0	112	1	2	0	0	0	1	37
Connecticut:												
Bridgeport	0	0	------	0	1	0	1	0	0	0	0	0
Hartford	1	0	------	0	1	0	5	0	3	0	0	2
New Haven	0	0	------	0	21	1	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	12	1	4	0	6	0	1	5
New York	7	2	3	1	897	37	56	2	72	0	4	88
Rochester	0	0	------	0	40	1	4	0	1	0	0	8
Syracuse	0	0	------	0	26	0	1		0	0	0	18
New Jersey:												
Camden	0	0	------	0	0	1	2	0	0	0	0	0
Newark	0	0	------	0	100	0	7	0	4	0	0	47
Trenton	0	0	1	0	1	2	0	0	0	0	0	0
Pennsylvania:												
Philadelphia	5	0	3	1	159	6	23	0	21	0	1	88
Pittsburgh	6	0	2	2	12	5	12	0	13	0	0	34
Reading	0	0	------	0	2	0	1	0	0	0	0	11
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	19	2	4	0	9	0	1	7
Cleveland	2	0	1	0	12	3	11	0	10	0	0	66
Columbus	0	0	------	0	32	0	4	0	2	0	0	1
Indiana:												
Fort Wayne	0	0	------	0	11	0	2	0	0	0	0	0
Indianapolis	1	0	------	2	25	0	6	0	4	0	0	26
South Bend	0	0	------	0	8	0	0	0	0	0	0	1
Terre Haute	0	0	------	0	1	0	0	0	0	0	1	1
Illinois:												
Chicago	7	0	2	3	222	7	19	0	26	0	1	63
Springfield	0	0	------	0	2	1	0	0	1	0	0	1
Michigan:												
Detroit	2	0	------	0	465	5	8	0	13	0	1	50
Flint	0	0	------	0	4	0	0	0	0	0	0	1
Grand Rapids	0	0	------	0	104	0	0	0	2	0	0	14
Wisconsin:												
Kenosha	0	0	------	0	3	0	0	0	0	0	0	2
Milwaukee	0	0	------	0	222	0	1	0	27	0	0	57
Racine	0	0	------	0	4	0	1	0	8	0	0	1
Superior	1	0	------	0	16	0	0	0	0	0	0	1

City reports for week ended July 3, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	146	0	0	0	0	0	0	4
Minneapolis	0	0	------	0	11	0	5	0	1	0	1	1
St. Paul	0	0	------	0	29	1	2	0	4	0	0	42
Missouri:												
Kansas City	0	1	------	0	22	1	10	1	6	0	0	6
St. Joseph	0	0	------	0	2	0	0	0	0	0	0	0
St. Louis	0	0	1	1	43	4	14	0	5	0	1	32
Nebraska:												
Omaha	0	0	------	0	1	1	0	0	2	0	0	0
Kansas:												
Topeka	1	0	------	0	15	0	0	0	0	0	0	17
Wichita	0	0	------	0	3	0	3	0	0	0	0	7
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	1	3	0	0	0	0	0
Maryland:												
Baltimore	2	0	2	1	73	2	11	0	11	0	0	121
Cumberland	0	0	------	0	0	0	1	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	55	2	6	0	7	0	0	36
Virginia:												
Lynchburg	0	0	------	0	10	1	1	0	0	0	0	8
Richmond	0	0	------	1	18	0	0	0	0	0	1	13
Roanoke	1	0	------	0	3	0	0	0	0	0	0	2
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	1
Wheeling	0	0	------	0	0	0	2	0	0	0	0	16
North Carolina:												
Winston-Salem	0	0	1	0	1	0	0	0	0	0	0	54
South Carolina:												
Charleston	0	0	2	0	0	0	2	0	0	0	0	2
Georgia:												
Atlanta	0	0	5	0	1	0	1	0	1	0	0	3
Brunswick	0	0	------	0	1	1	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	0	0	0	0
Florida:												
Tampa	0	0	------	0	0	0	4	0	0	0	0	5
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	19	0	3	0	0	0	0	19
Nashville	0	0	------	1	2	0	1	0	0	0	0	10
Alabama:												
Birmingham	0	0	4	0	10	0	6	0	0	0	3	0
Mobile	1	0	------	1	3	0	0	0	1	0	1	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	0	0	0	1
Louisiana:												
New Orleans	3	0	1	1	10	4	6	1	1	0	0	2
Shreveport	0	0	------	0	0	0	5	0	1	0	0	0
Texas:												
Dallas	1	0	------	0	2	0	2	4	4	0	1	17
Galveston	0	0	------	0	0	0	0	1	1	0	0	0
Houston	0	0	------	0	0	0	6	3	0	0	0	13
San Antonio	0	0	------	0	1	0	3	0	2	0	1	3

City reports for week ended July 3, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza: Cases	Influenza: Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
MOUNTAIN												
Montana:												
Billings	0	0	------	0	11	0	1	0	0	0	0	0
Great Falls	0	0	------	0	5	0	0	0	3	0	0	2
Helena	0	0	------	0	2	0	0	0	0	0	0	0
Missoula	0	0	------	0	1	0	3	0	1	0	0	0
Colorado:												
Denver	3	0	5	0	5	3	6	5	3	0	0	10
Pueblo	0	0	------	0	1	0	1	0	0	0	0	6
Utah:												
Salt Lake City	0	0	------	0	15	0	0	0	4	0	0	44
PACIFIC												
Washington:												
Seattle	1	0	------	0	83	0	7	3	4	0	0	11
Spokane	2	0	------	0	13	0	3	0	7	0	0	7
Tacoma	0	0	------	0	0	0	1	0	2	0	0	6
California:												
Los Angeles	1	0	9	1	89	3	9	2	18	0	0	35
Sacramento	1	0	------	0	7	0	4	7	0	0	0	10
San Francisco	0	0	1	1	16	3	10	3	9	0	0	15
Total	49	4	43	17	3,435	109	335	32	406	0	21	1,247
Corresponding week, 1942	60	2	24	12	1,899	15	214	7	379	2	25	1,162
Average, 1938-42	66	------	30	[1] 14	[2] 2,282	------	[1] 232	------	539	4	31	1,237

Dysentery, amebic.—Cases: New York, 7; Sacramento, 1.
Dysentery, bacillary.—Cases: New York, 3; Charleston, S. C., 21; Atlanta, 1; Nashville, 3; Los Angeles, 8.
Dysentery, unspecified.—Cases: San Antonio, 16.
Leprosy.—Cases: New Orleans, 1.
Rocky Mountain spotted fever.—Cases: New York, 1; Washington, 1; Winston-Salem, 1.
Tularemia.—Cases: New Orleans, 1.
Typhus fever.—Cases: Brunswick, 5; Tampa, 1; New Orleans, 4; Dallas, 1; Houston, 2.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,624,400)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza: Case rates	Influenza: Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
NEW ENGLAND	2.5	2.5	0	0	760	27.3	65.6	0	221.1	0	5.0	194
MIDDLE ATLANTIC	8.0	.9	4.0	1.8	557	23.6	49.1	.9	52.2	0	2.7	133
EAST NORTH CENTRAL	7.6	0	1.8	2.9	672	10.5	32.7	0	59.6	0	2.3	171
WEST NORTH CENTRAL	2.0	2.0	2.0	2.0	538	13.8	67.2	2.0	35.6	0	4.0	216
SOUTH ATLANTIC	5.2	0	17.4	3.5	283	12.1	53.8	0	33.0	0	1.7	444
EAST SOUTH CENTRAL	5.9	0	23.8	11.9	202	0	59.4	0	5.9	0	23.8	172
WEST SOUTH CENTRAL	11.7	0	2.9	2.9	38	11.7	67.5	26.4	26.4	0	5.9	111
MOUNTAIN	25.1	0	41.8	0	334	25.1	91.9	41.8	91.9	0	0	518
PACIFIC	8.7	0	17.5	3.5	364	10.5	59.4	26.2	69.9	0	0	147
Total	7.4	.6	6.5	2.6	517	16.4	50.4	4.8	61.1	0	3.2	183

PLAGUE INFECTION IN COLORADO AND OREGON

Plague infection has been reported proved in pools of fleas and lice from rodents collected in Colorado and Oregon as follows:

COLORADO

Larimer County.—June 21, 70 fleas from 38 black-tailed prairie dogs, *Cynomys ludovicianus*, taken on a ranch 5 miles northwest of Wellington. This was stated to be the first indication of plague infection in eastern Colorado, although hunting has been carried on in previous years in this and other areas in the eastern part of the State.

OREGON

Grant County.—June 24, 170 fleas and 25 lice from 63 ground squirrels, *C. oregonus*, taken 6 miles east of Long Creek.

Malheur County.—June 22, 14 fleas from 21 ground squirrels, *C. oregonus*, taken 6 to 11 miles west of Jordan Valley.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 19, 1943.—During the week ended June 19, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		41	1	126	336	41	25	24	116	710
Diphtheria		23		19		1				43
Dysentery (amebic)						2				2
Dysentery (bacillary)				14						14
German measles		5		24	125	14	10	35	31	244
Influenza		12			7	4	2		3	28
Measles		87	3	435	1,663	146	103	206	329	2,972
Meningitis, meningococcus		1			4	1		1	3	10
Mumps		79	9	67	407	97	31	40	93	823
Poliomyelitis		1		2		1				4
Scarlet fever	1	18	13	78	132	54	24	55	49	424
Tuberculosis (all forms)	1	8	6	126	52	12	34	12	45	296
Typhoid and paratyphoid fever				12	1					13
Undulant fever				9	2				2	13
Whooping cough				117	191	35	6	31	58	438

CUBA

Provinces—Notifiable diseases—4 weeks ended May 22, 1943.—During the 4 weeks ended May 22, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Anthrax						1	1
Cancer	1	1	6	9		11	28
Chickenpox			4	3	3	4	14
Diphtheria		31	3			1	35
Leprosy		4		2		1	7
Malaria	37	5		2		111	155
Measles		31	6		1	9	47
Poliomyelitis	2		1	2			5
Scarlet fever		1			1		2
Tuberculosis	13	104	17	46	21	51	252
Typhoid fever	9	43	21	72	19	24	188

[1] Includes the city of Habana.

IRISH FREE STATE

Vital statistics—First quarter ended March 31, 1943.—The following vital statistics for Irish Free State for the first quarter ended March 31, 1943, are taken from the Quarterly Return of Marriages, Births, and Deaths issued by the Registrar General and are provisional:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	4,549	6.2	Deaths from—Cont.		
Births	16.679	22.7	Influenza	125	0.2
Deaths, all causes	12.603	17.1	Measles	9	--------
Deaths under 1 year of age	1,561	[1] 94	Puerperal infection	6	[1] .4
Deaths from:			Scarlet fever	13	--------
Cancer	970	1.3	Tubercul		
Diarrhea and enteritis (under			Typhoid fe		
2 years of age)	277	--------	Typhus f		
Diphtheria	94	--------	Whoopin		

[1] Per 1,000 live births.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

India (French).—For the 4 weeks ended March 27, 1943, 49 cases of cholera with 35 deaths were reported in French India as follows: Chandernagor, 4 cases, 1 death; Karikal, 28 cases, 23 deaths; Pondichery, 17 cases, 11 deaths.

Plague

Morocco—Casablanca.—On June 16, 1943, 1 confirmed case and 1 suspected case of plague were reported in Casablanca, Morocco.

Peru.—During the month of April 1943, plague was reported in Peru as follows: Libertad Department, 3 cases, 1 death; Piura Department, 2 cases, 2 deaths. Plague infected rats were also reported in Piura Department.

Smallpox

Indochina.—For the period June 1–10, 1943, 120 cases of smallpox were reported in Indochina as follows: Annam, 26 cases; Cambodia, 21 cases; Cochinchina, 53 cases; Tonkin, 20 cases.

Morocco (French).—During the month of May 1943, 57 cases of smallpox were reported in French Morocco.

Sudan (French).—For the period May 21–31, 1943, 128 cases of smallpox with 3 deaths were reported in French Sudan.

Typhus Fever

France—Seine Department.—During the month of May 1943, 2 cases of typhus fever were reported in Seine Department, France.

Hungary.—For the 2 weeks ended June 26, 1943, 30 cases of typhus fever were reported in Hungary.

Iran—Tehran.—During the week ended May 1, 1943, 470 cases of typhus fever with 80 deaths were reported in Tehran, Iran.

Mexico—Mexico, D. F.—Typhus fever has been reported in Mexico, D. F., Mexico, as follows: Weeks ended—April 3, 1943, 40 cases, 9 deaths; April 10, 26 cases, 1 death; April 17, 26 cases, 8 deaths; April 24, 15 cases, 4 deaths.

Morocco (French).—During the month of May 1943, 1,921 cases of typhus fever were reported in French Morocco.

Rumania.—For the period June 24–30, 1943, 148 cases of typhus fever were reported in Rumania.

Spain.—During the week ended May 29, 1943, 59 cases of typhus fever were reported in Spain.

Yellow Fever

Gold Coast—Kibi.—On June 22, 1943, 1 fatal case of suspected yellow fever was reported in Kibi, Gold Coast.

Sierra Leone—Freetown.—On June 12, 1943, 1 fatal case of suspected yellow fever was reported in Freetown, Sierra Leone.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

In contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.
Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 JULY 30, 1943 NUMBER 31

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Public Health Reports

Vol. 58 • JULY 30, 1943 • *No. 31*

STUDIES ON STRAINS OF *AEROBACTER CLOACAE* RESPONSIBLE FOR ACUTE ILLNESS AMONG WORKERS USING LOW-GRADE STAINED COTTON [1]

By B. H. Caminita, R. Schneiter, R. W. Kolb, and P. A. Neal, *United States Public Health Service*

Two previous papers by Neal, Schneiter, and Caminita (*17, 20*) have presented conclusive evidence that outbreaks of acute illness among workers using low-grade stained cotton were due to an endotoxic substance produced by a Gram-negative, rod-shaped microorganism present in large numbers in and on the cotton fibers. The organism was tentatively classed in the genus *Aerobacter* and, for convenience, it was referred to as the "cotton bacterium." The clinical syndrome of the acute illness described closely resembled that of mill fever reported among cotton mill operatives and hemp fever and grain fever reported among hemp plant workers and grain handlers, respectively. Therefore, samples of cotton mill dust, hemp mill dust, and grain elevator dust were examined and cultures of microorganisms identical with those isolated from the stained cotton were obtained. This paper presents the results of taxonomic studies on cultures of the "cotton bacterium" isolated from various sources.

SOURCE OF CULTURES

One hundred twenty-six samples of materials were received for analysis. These included 103 samples of various grades of raw cotton, 2 samples of cotton seed, 7 of cotton mill dust, 2 of soil from cotton-growing regions, 4 of grain elevator screenings, 2 of hemp mill dust, and 3 of whole hemp plants. A quantitative bacteriological examination was made of each sample as follows: A 1:100 dilution was prepared by aseptically weighing 1 gm. of material into 100 cc. of sterile

[1] From the Division of Industrial Hygiene, National Institute of Health.

physiological saline in wide-mouth, screw cap bottles which were then shaken mechanically for 20 minutes. Serial dilutions from 1:1,000 to 1:100,000,000 were made from the resulting suspensions. In the early investigations aliquot portions of each serial dilution were plated on standard beef infusion agar for the detection of bacteria and on potato carrot dextrose agar [2] for the detection of fungi. The beef infusion agar plates were incubated for 24 hours at 37° C. while the potato carrot dextrose agar plates were incubated at room temperature.

It was immediately apparent that the stained cotton samples were heavily contaminated with one type of micro-organism which occurred to the exclusion of significant numbers of other types of bacteria. This organism formed characteristic, large, colorless to pale yellow, mucoid colonies on potato carrot dextrose agar. This medium was therefore adopted for routine analyses.

Very high plate counts (3,000,000 to more than 10,000,000,000 per gram) of mucoid bacteria were obtained on low-grade stained cotton, cotton dust, cotton seed from stained or bolly cotton, bolly cotton in the boll, low grades of tinged cotton, and grain elevator dust. Plate counts of about 500,000 mucoid organisms per gram were obtained on 2 samples of hemp dust and 1 sample of retted hemp plants. No mucoid organisms were found in soil in which cotton had grown, nor in most samples of white cotton and high-grade tinged cotton, nor in 3 samples of unretted hemp plants.

Two hundred and fifty-eight cultures were isolated from the various samples examined and from nose and throat swabs taken during or immediately after illness due to inhaling dust from low-grade cotton. After preliminary biochemical studies had indicated that the majority of these cultures were very similar, one representative culture from each source was selected and purified by repeated plating. One hundred and seven such cultures were subjected to intensive study.

On the basis of studies detailed below the characteristic mucoid organisms were classified as *Aerobacter cloacae*. While numerous workers have studied *A. cloacae* in connection with other members of the coliform group, no reference was found in the literature to a taxonomic study of this organism since the work of Jordan in 1890. Jordan's description is incomplete by present-day standards. Although *A. cloacae* is usually reported as a white organism, Rogers, Clark, and Evans (*18*) isolated yellow strains from grain, and MacConkey (*13*) isolated from horse feces, pond water, roof washings, oats, beans, malt, and corn a yellow organism which seems to be biochemically identical with the type 1 cultures described herein. While he did not name this yellow organism, he did designate as *B.*

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[2] Formula: Potatoes, 2,000 gm.; carrots, 500 gm.; dextrose, 200 gm.; magnesium sulfate, 3.0 gm.; calcium carbonate, 2.0 gm.; agar, 150 gm.; and water, 10 liters. pH adjusted to 6.8.

cloacae a white organism which was biochemically identical with the type 2 cultures described below.

Because of the paucity of complete taxonomic studies on *A. cloacae* and because of the potential occupational hazard from organisms of this type if present in large numbers in dust from organic materials such as grain and vegetable fibers during their initial processing, it seems desirable to describe in detail the strains isolated from the low-grade cotton.

Four different types of *A. cloacae* were arbitrarily distinguished on the basis of certain carbohydrate fermentations. Type 1, a yellow organism, did not actively ferment adonitol, inositol, or inulin. It did ferment dulcitol and sorbitol. It was the predominant organism in 75 samples of stained or tinged cotton, 5 samples of cotton mill dust, 2 samples of cotton in the boll, 1 sample of cotton seed, 2 samples of hemp dust, a hemp plant after retting, and 2 samples of grain dust.

Type 2, a white organism, did not actively ferment adonitol, inositol, inulin, or dulcitol. It did ferment sorbitol. It was the predominant organism in 1 sample of stained cotton, 2 samples of cotton mill dust, and 2 samples of grain dust.

Type 3, represented by a small number of closely related cultures, was a white or a yellow organism, which did not actively ferment adonitol and inulin; it produced acid and sometimes gas in inositol. These cultures differed from each other only in their reactions on dulcitol and sorbitol. Type 3 organisms predominated in 4 samples of stained cotton, 2 samples of white cotton, and 1 sample of cotton seed.

Type 4 cultures varied widely in their fermentation reactions on the various carbohydrates. This type of organism predominated in 4 samples of stained cotton and 1 sample of hurds from a hemp breaker.

Table 1 summarizes the biochemical reactions by which the four types were arbitrarily differentiated.

TABLE 1.—*Differentiation characteristics of four types of* A. cloacae

	Fermentation of—			
	Dulcitol	Sorbitol	Inositol	Saccharides [1]
Type 1	+	+	−	+
Type 2	−	+	−	+
Type 3	±	±	+	+
Type 4	±	±	±	±

[1] See table 3.

Table 2 shows the number and kind of samples examined and incidence of the various types differentiated above. It should be noted that type 1 organisms predominated in 65 of 74 samples of

cotton and in 5 of 7 samples of cotton mill dust, all of which samples were reported or suspected to have caused acute illness. Type 1 is the organism which, on the basis of previous experimental work, is known to produce an endotoxic substance capable of causing acute illness (Neal, Schneiter, and Caminita (*17*)). Type 1 was not isolated, even on repeated examination, from the other 9 samples of cotton (of the total 74 samples) and 2 samples of cotton dust which had high plate counts of mucoid bacteria. One sample of such cotton and the two samples of cotton dust contained type 2 organisms; four samples of cotton contained type 3 organisms and three samples contained type 4. One cotton sample, reported to have been treated with ultraviolet light, contained no mucoid organisms. It will be noted, also, that type 1 organisms occurred in grain dust and, in comparatively low numbers, in hemp dust. This hemp dust was not reported to have caused illness.

TABLE 2.—*Number and types of* Aerobacter cloacae *isolated from various materials examined*

Type of material	Total number samples	Number samples containing type 1	Number samples containing type 2	Number samples containing type 3	Number samples containing type 4	Number samples containing no mucoid organisms other than spore formers	Average plate count mucoid organisms/gm. (millions)
Cotton, stained or tinged, reported or suspected to have caused illness	74	65	1	4	3	[1]1	678.0
Cotton mill dust, reported or suspected to have caused illness	7	5	2				2,480.0
Cotton, stained, reported *not* to have caused illness	5	2			1	2	399.0
Cotton, stained, history unknown	3	1				2	155.0
Cotton, stained or tinged, obtained from U. S. Dept. of Agriculture for comparison	10	7				3	114.5
Cotton, white, obtained from U. S. Dept. of Agriculture, for comparison	9			2		7	[2]
Cotton in boll (bolly cotton)	2	2					48.0
Cotton seed	2	1		1			39.0
Cotton plant debris	1					1	.0
Soil in which bolly cotton had grown	2					2	.0
Hemp dust	2	2					.6
Hemp plant after retting	1	1					.5
Hurds from hemp breaker	1				1		<.1
Hemp plant, unretted	3					3	.0
Grain dust (elevator screenings)	4	2	2				18.0

[1] This sample was reported to have been treated with ultraviolet light.
[2] These two samples had plate counts of 12,000 and 13,000 mucoid organisms per gram, respectively. It is felt that these samples were accidentally contaminated by contact with other samples since the counts were low and no other white cotton samples contained mucoid organisms.

DESCRIPTION OF THE ORGANISM

MORPHOLOGY

Form.—Short, thick rods with round ends. Cultures incubated at 20° C. show organisms uniform in size and shape while those incubated at 37° C. show occasional filaments and many coccoid forms (fig. 1). Broth cultures and old agar slant cultures commonly show poorly stained, granular, or bipolarly stained forms ranging from filamentous to coccoid in shape.

Size.—On potato carrot dextrose agar, incubated 24 hours at 37° C., the organisms average 2×0.7 microns. They are slightly larger when incubated at 20° C.

Arrangement.—Single. Occasionally paired.

Motility.—Actively motile in hanging drop preparations. Long peritrichous flagella were demonstrated with Maneval's (*15*) stain. In many preparations, however, organisms having one flagellum or several polar flagella were seen (fig. 2).

Staining reaction.—The organisms are Gram-negative when stained with Hucker's modification of the Gram stain (*16*, Leaflet IV), and nonacid fast. Cultures incubated at 37° C. often showed bipolar staining and granular forms.

Spore formation.—No spores were demonstrated in 7-day agar slant cultures with Schaeffer and Fulton's modification of the Wirtz method (*16*, Leaflet IV). The low thermal death time of the organisms (see below) also precludes spore formation.

Capsule formation.—A capsule is easily demonstrated with Anthony's (*16*, Leaflet IV) stain and is often visible with Gram's stain. Cultures grown on potato carrot dextrose agar for 24 hours at 37° C. are always encapsulated. Those on horse meat infusion agar for 24 hours at 37° C. may show a thin capsule. The heavy capsules are unevenly distributed around the organism, being concentrated at one or both ends (fig. 1). In this respect these organisms resemble *A. transcapsulatus* (*22*). The bipolar staining reaction noted above appeared to be due to two organisms being joined by their encapsulated ends.

Pigment production.—All type 1 and some type 3 and type 4 cultures produced pigment after a week's incubation on horse meat infusion agar, potato carrot dextrose agar, and in tryptose phosphate broth. Pigment is produced more rapidly at 20° C. or below than at 37° C.; it is completely soluble in absolute methanol and slightly soluble in weak alkali.

CULTURAL CHARACTERISTICS

Agar slant.—Potato carrot dextrose agar or beef infusion dextrose agar incubated 24 hours at 37° C.—Growth is smooth, shining, spreading, greyish, or yellowish. It is markedly mucoid, forming a deep pocket at the foot of the slant. All growth may flow down the slant into this pocket (fig. 3).

Horse meat infusion agar and potato carrot agar without dextrose incubated 24 hours at 37° C.—Growth is smooth, shining, spreading, nonmucoid, butyrous, greyish on slant but cream colored when scraped up on a needle. Growth sometimes consists of many small separate colonies ("nailhead" appearance).

Agar plate.—Potato carrot dextrose agar.—Large mucoid, convex, spreading colonies, sometimes colorless and at other times yellowish, streaked with white (fig. 4). Subsurface colonies are lens-shaped or cuneiform and often crack the medium whence they grow typically on the surface. Occasionally a flat grey spreading colony is observed.

Horse meat infusion agar.—Colonies are small to medium, convex, smooth, and shining. They are colorless or off-white.

Broth.—Tryptose phosphate broth incubated 24 hours at either 37° C. or 20° C.—Growth is very luxuriant. The medium is turbid; a delicate pellicle forms which falls to the bottom of the tubes where heavy sediment collects. On prolonged incubation a thick ring forms around the tube at the surface of the medium. In cultures incubated at 20° C. this ring is yellow and sometimes viscous.

Blood agar plates.—The organisms are nonhemolytic.

BIOCHEMICAL FEATURES

Shortly after isolation each culture was tested on the differential chemical compounds listed below. After 2 years' cultivation on potato carrot dextrose agar, all available type 1, 2, and 3 cultures, were transplanted several times to horse meat infusion agar and a final series of tests was made on those compounds which seemed to have some differential value. Unless otherwise noted, incubation temperature was 37° C. Incubation time was 7 days, sometimes extending to 3 weeks. Readings were usually recorded at 24, 48, 72 hours, 1 week, and 3 weeks. Since type 4 cultures varied widely in their ability to ferment carbohydrates, it does not seem advisable to include a detailed report of their reactions. The following reactions apply to types 1, 2, and 3 only.

Lactose.—Acid is produced in lactose in 24 hours. Gas production and reversion to an alkaline reaction begin usually in 4 to 7 days. The amount of gas produced in 7 days ranges from 10 to 50 percent of the capacity of the Durham tubes. Type 2 and type 3 cultures

FIGURE 1 —Potato carrot dextrose agar slant culture 24 hours at 37° C, Gram s stain A few capsules are visible

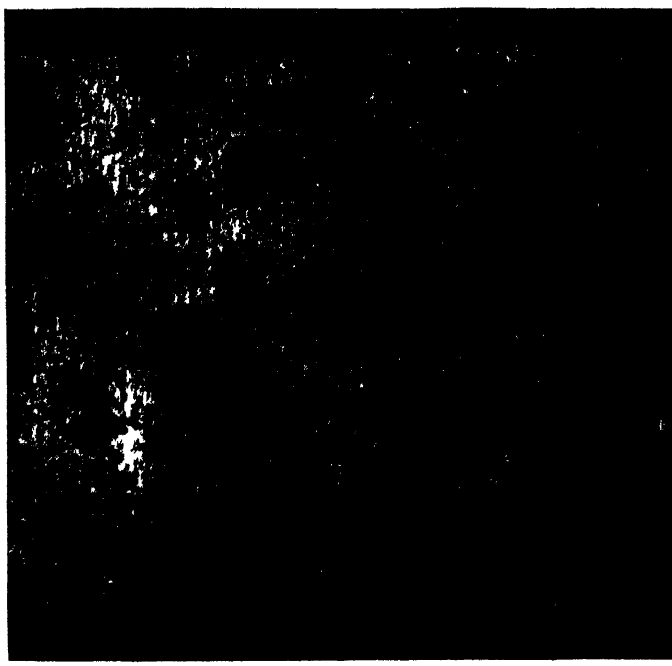

FIGURE 2 —Peritrichous flagella, Manev al s stain

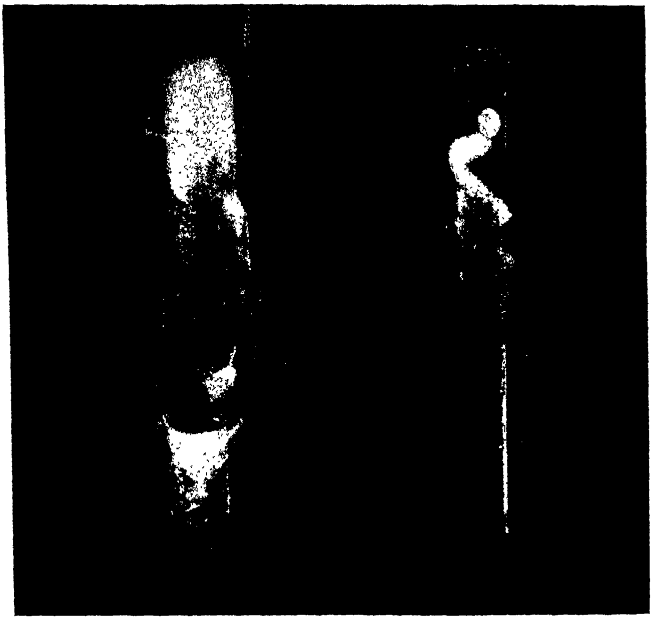

FIGURE 3.—Mucoid growth on potato carrot dextrose agar slant (left); butyrous growth on horse meat infusion agar slant (right).

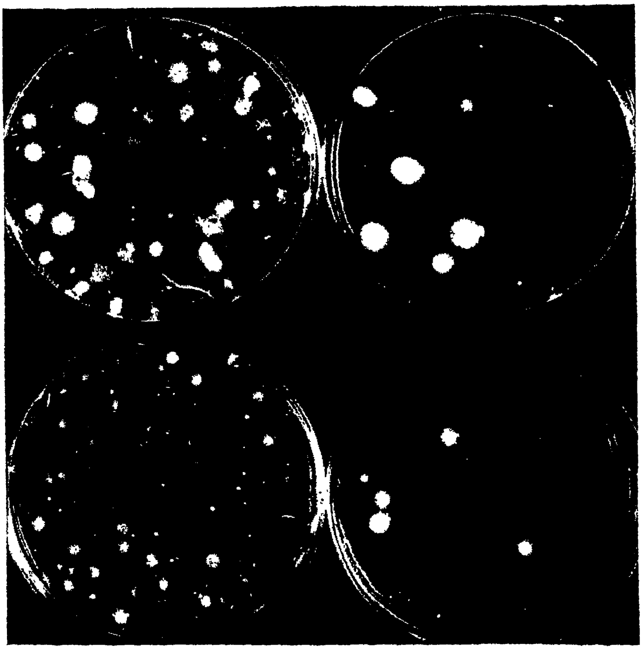

FIGURE 4.—Mucoid colonies on potato carrot dextrose agar.

generally produced 50 percent gas. Cultures varied in the speed of the fermentation. Some cultures, immediately after isolation, produced acid and gas in lactose in 24 hours. Other cultures failed to produce gas in 7 days. However, at some time during this study every type 1, 2, and 3 culture did produce acid and gas in lactose within 3 weeks. In the final tests 80 available cultures produced acid and gas in lactose, gas production beginning at 4 days' incubation. Thirteen of these cultures required 2 weeks to produce a significant amount of gas. Reduction of the indicator sometimes takes place but is not a constant characteristic of any one culture. The fermentation of lactose at 20° C. does not differ materially from that at 37° C.

Indol production.—Indol is not produced by any of the cultures. The medium consisted of Bacto tryptone (Difco), 10 gm., and distilled water, 1,000 cc., sterilized by autoclaving at 15 lbs., 121.6° C., for 15 minutes. The final pH was 7.0 to 7.2. Cultures were tested for indol production by the methods of Ruchhoft et al. (*19*) after an 18- to 24-hour incubation. Representative cultures incubated as long as 7 days did not produce indol.

Acetylmethylcarbinol production.—The Voges-Proskauer reaction is strongly positive, although after 18 months' maintenance on artificial culture media 4 of 80 available cultures gave a weak reaction. The medium consisted of Difco proteose peptone, 5 gm.; dextrose, 5 gm.; dipotassium phosphate (K_2HPO_4), 5 gm.; distilled water, 1,000 cc. The mixture was steamed 20 minutes, reaction corrected to pH 7.0, and filtered before autoclaving at 15 lbs., 121.6° C., for 15 minutes. Final pH was 6.8 to 7.0. Barritt's (*2*) reagent was used for testing for acetylmethylcarbinol after 24 to 48 hours' incubation at 37° C.

Methyl red reaction.—The methyl red reaction is negative. However, after 18 months' cultivation two typical cultures had a positive methyl red reaction and 35 others out of 80 retested had a weakly positive reaction. Cultures were incubated 4 days before testing.

Sodium citrate utilization.—All cultures showed a heavy cloudy growth after 24 hours' incubation at 37° C. in Koser's sodium citrate medium (*21*).

Uric acid utilization.—This medium (*21*) was used in the final tests. The 80 cultures used showed a fine hazy growth after 24 hours at 37° C. After a week's incubation a fine granular sediment was present in small amounts without an increase in turbidity.

Sodium hippurate hydrolysis.—Hajna and Damon (*7*), using 30 strains of *A. cloacae*, reported that these organisms failed to hydrolyze sodium hippurate. In these studies 81 cultures were inoculated into their medium. Nine cultures, including types 1, 2, and 3, gave a strongly positive test for hydrolysis after 3 days' incubation; a slight

degree of hydrolysis was produced by 13 other cultures, including types 1, 2, and 4.

Monosaccharide fermentation.—Arabinose, galactose, glucose, levulose, mannose, rhamnose, and xylose are fermented with production of acid and gas in 24 hours. The reaction of the medium is reversed to the alkaline side within 7 days. Reduction of the indicator was occasionally observed.

Disaccharide fermentation.—Cellobiose, maltose, sucrose, and trehalose are fermented with acid and gas production in 24 hours. The reaction of the medium is reversed within 7 days. Reduction of the indicator is often noted in trehalose. The fermentation of lactose has been discussed above.

Trisaccharide fermentation.—Raffinose is attacked with acid and gas production in 24 hours. The reaction of the medium is reversed to the alkaline side within 7 days.

Polysaccharide fermentation.—Dextrin is attacked with acid and gas production in 24 hours. The reaction of the medium is reversed within a week. Starch is fermented with acid and a small amount of gas in 24 hours. Gas, ranging in amount from a bubble to 25 percent of the capacity of the Durham tube, is produced within 7 days, and the reaction of the medium is reversed. Inulin is not actively fermented, but after 24 hours an acid reaction is noted in the Durham tube. Glass electrode pH determinations show a slight but significant decrease of pH in the medium. The alkalinity of the medium then increases within 7 days to about pH 8.5 to 9.0. A bubble of gas is sometimes present. No further change occurs after 3 weeks' incubation.

Alcohol fermentation.—Mannitol is fermented with acid and gas production in 24 hours and reversion of the reaction of the medium occurs within 7 days. Glycerol is attacked with acid production in 24 hours. After 4 or 5 days' incubation a bubble of gas sometimes appears. The reaction of the medium is reversed after 7 days' incubation and there is no further change after 3 weeks' incubation. Adonitol is not actively fermented. An acid reaction is present in the Durham tube within 24 hours, but the medium, examined by glass electrode, becomes progressively alkaline. This type of reaction was interpreted as negative.

Dulcitol is fermented by type 1 cultures with production of acid and gas in 24 hours. It is not actively fermented by type 2, the reaction being similar to that described above for adonitol. Type 3 cultures were variable in the production of acid and gas from dulcitol.

Inositol, like adonitol, is not actively fermented by types 1 and 2. Acid and gas is usually produced by type 3.

Sorbitol is attacked by types 1 and 2 with acid and gas production in 24 hours. It is not consistently fermented by type 3.

Glucoside fermentation.—Salicin is fermented with acid and gas production in 24 hours. There is no other change in the reaction of the medium after 7 days' incubation.

The base for the sugar differential media was made as follows: Meat extract, 3 gm.; Bacto proteose peptone No. 3, 10 gm.; sodium chloride, c. p., 5 gm.; phenol red (phenolsulfonephthalein), 0.02 gm.; and distilled water, 900 cc. The meat extract, peptone, and NaCl were dissolved in distilled water, steamed for 20 minutes, and the reaction was corrected to pH 7.6. The mixture was then reheated and the reaction recorrected if necessary. The phenol red indicator was added, the medium was filtered through paper and sterilized at 15 pounds pressure, 121.6° C., for 15 minutes. Five grams of the desired fermentable substance were dissolved in 100 cc. distilled water, sterilized by filtration through a Berkefeld or Seitz filter, and added to 900 cc. of the phenol red broth base. The medium was then dispensed into tubes which were steamed 20 minutes to drive air from the Durham tubes. The tubes were then incubated 24 hours at 37° C. to confirm sterility. Final pH value was 7.4 to 7.6.

Starch broth prepared by the above method failed to give a positive test for starch with iodine water. Therefore, Bacto nutrient broth was used, Difco soluble starch to make a 1-percent solution was added, and the mixture was steamed just long enough to dissolve the starch. The reaction was adjusted to pH 7.2 to 7.4 and the phenol red indicator was added, the medium was dispensed into tubes and autoclaved 10 minutes at 10 pounds, 115° C., for 10 minutes. The tubes were incubated 48 hours to confirm sterility. Final pH was 7.0. Control tubes made without indicator gave a positive test for starch with iodine water and a negative test for reducing sugars with Benedict's solution.

Litmus milk.—The medium is slightly acid after 24 hours' incubation. Coagulation and reduction of the indicator begin in 120 hours and are generally complete after 7 days' incubation. After 3 weeks' incubation gas may be present and some digestion may occur. The medium consisted of sterile skimmed milk heated to 80° C., with the reaction corrected to pH 7.6, and sterile saturated litmus solution added. The medium was dispensed into sterile tubes and incubated 24 hours at 37° C. to confirm sterility. Final pH was 7.4 to 7.6.

Gelatin liquefaction.—Gelatin is usually completely liquefied in 4 days. Some cultures liquefied gelatin in 48 hours and others took as

long as 11 days. Three cultures failed to liquefy gelatin in the final test although they had done so in previous tests. All cultures were incubated 3 weeks at 37° C. They were tested daily for liquefaction by placing inoculated and control tubes in the refrigerator until the control tubes had hardened, when readings were made on the inoculated tubes. The medium consisted of horse meat infusion broth, 1,000 cc., and Bacto gelatin, 125 gm. The gelatin was added to the broth and allowed to soak for 30 minutes. The mixture was then steamed until the gelatin dissolved. The reaction was corrected to pH 7.6 and the medium was dispensed into tubes and sterilized for 15 minutes at 15 lbs., 121.6° C. The final pH was 7.2 to 7.4.

Hydrogen sulfide production.—Production of hydrogen sulfide is doubtful. About half the cultures tested showed a light brown discoloration along the line of the stab after a week's incubation. The other cultures grew without discoloring the medium. The medium consisted of Bacto proteose peptone No. 3, 20 gm.; agar, 15 gm.; lead acetate, 0.5 gm.; dextrose, 1 gm.; and distilled water, 1,000 cc. The medium was tubed and sterilized at 15 lbs. pressure, 121.6° C., for 15 minutes. Final pH value was 6.6 to 6.8.

Eosin-methylene blue medium.—Levine's (*10*) e. m. b. medium streaked from 24-hour lactose broth cultures showed atypical, small, smooth, rose-colored colonies. Occasionally mucoid colonies were noted. However, none of the cultures developed colonies typical for *Aerobacter* on this medium.

Nitrate reduction.—Nitrates were reduced to nitrites in 24 hours. The medium consisted of Bacto peptone, 1 gm.; potassium nitrate (free of nitrite), 0.2 gm.; and distilled water, 1,000 cc. The medium was sterilized at 15 pounds, 121.6° C., for 15 minutes. The final pH value was 6.6 to 6.8. The test reagents recommended in the Manual of Methods for Pure Culture Study (*16*) were used.

According to Bergey's Manual of Determinative Bacteriology (*3*), the Imvic [3] reaction and fermentation of dextrose and lactose place the organisms in the genus *Aerobacter*, while the properties of gelatin liquefaction and incomplete glycerol fermentation distinguish *Aerobacter cloacae* from *A. aerogenes*. The organisms were therefore classified as *A. cloacae*.

The biochemical reactions for each of the 4 types of cultures studied are recorded in table 3.

[3] Indol production, methyl red and Voges-Proskauer reactions, and sodium citrate utilization.

TABLE 3.—*Biochemical reactions of* A. cloacae

	Cultures under investigation				American Type Culture Collection			
	Type 1	Type 2	Type 3	Type 4	222	529	961	962
Lactose[1]	AG	AG	AG	AG	AG	A	AB	AB
Indol	−	−	−	−	−	−	−	−
Methyl red	−	−	−	−	−	−	−	−
Voges-Proskauer	+	+	+	+	+	+	±	±
Sodium citrate	+	+	+	+	+	+	+	+
Adonitol[2]	−	−	−	−	−	−	−	−
Arabinose	AG	AG	AG	Variable	AG	AB	AG	AG
Cellobiose	AG	AG	AG	A	AG	A	AB	AB
Dextrin	AG	AG	AG	Variable	AG	AB	AB	AB
Dextrose	AG	AG	AG	Variable	AG	AB	A	A
Dulcitol[2]	AG	−	Variable	Variable	−	−	−	−
Galactose	AG	AG	AG	Variable	AG	AB	AG	AG
Glycerol	A	A	A	A	A	A	A	A
Inositol[2]	−	−	AG	Variable	−	−	−	−
Inulin[2]	−	−	−	−	−	−	−	−
Levulose	AG	AG	AG	Variable	AG	AB	AG	AG
Maltose	AG	AG	AG	Variable	AG	AB	AG	AG
Mannitol	AG	AG	AG	Variable	AG	A	A	A
Mannose	AG	AG	AG	Variable	AG	A	AB	AB
Raffinose	AG	AG	AG	−	AG	A	AG	AG
Rhamnose	AG	AG	AG	Variable	AG	AB	AG	AG
Salicin	AG	AG	AG	....	AG	A	A	AG
Sucrose	AG	AG	AG	Variable	AG	AG	AB	AG
Starch	AG	AG	AG	....	AB	A	A	A
Sorbitol	AG	AG	Variable	Variable	AG	A	A	A
Trehalose	AG	AG	AG	Variable	AG	A	AB	AB
Xylose	AG	AG	AG	Variable	AG	A	AG	AG
Uric acid	+	+	+	....	+	+	+	+
Nitrate reduction	+	+	+	+	+	+	+	+
Litmus milk	ACR	ACR	ACR	ACR	ACR	ACR	ACR	ACR
H_2S production	±	±	±	±	±	±	±	±
Gelatin liquefaction	+	+	+	+	+	+	+	+

[1] Slow fermentation. Acid in 24 hours; gas after 4 days.
[2] These reactions are recorded as negative although acid was always present in the fermentation tube. In the case of inulin a small amount of acid was produced in the medium in 24 hours, as determined by glass electrode.
A = acid.
G = gas.
B = bubble.
ACR = acid coagulation and reduction.

PHYSIOLOGICAL CHARACTERISTICS

Temperature relations.—Studies were made on 12 representative cultures of types 1, 2, and 3. The thermal death time as determined by a slightly modified Magoon's (*14*) method was 56°–57° C. for 10 minutes. One type 3 culture survived temperatures up to 60° C. for 10 minutes. Eighteen-hour cultures on potato carrot dextrose agar (encapsulated) and on horse meat infusion agar (unencapsulated) were tested.

Potato carrot dextrose agar slants, horse meat infusion agar slants, and tryptose phosphate broth tubes were used to determine optimum, minimum, and maximum growth temperatures. The optimum ranges between 25° and 37° C. The minimum is between 5° and 10° C. In this range growth is very slow. The maximum growth temperature is between 42° and 45° C. in tryptose phosphate broth or on horse meat infusion agar slants. The organism grows very poorly on potato carrot dextrose agar in this temperature range.

Relation to reaction (pH) of medium.—The optimum pH is between 6.0 and 9.5. The test medium used was Bacto standard nutrient broth adjusted to the desired pH with N/1 sodium hydroxide. The organism incubated at 37° C. does not grow in this medium at pH 4.0 or at pH 10.0. All pH determinations were made with a glass electrode.

Oxygen relationships.—The organism is a facultative anaerobe. Tubes of chopped meat medium from which air had been removed by steaming and quick cooling were employed for these studies.

Dextrose dissimilation.—Carbon dioxide and hydrogen were produced from dextrose in a medium containing 1.0-percent Witte peptone, 0.5-percent anhydrous K_2HPO_4, and 1.0-percent dextrose. The ratio of CO_2 to H_2 was not determined.

SEROLOGICAL CHARACTERISTICS

Antigenicity.—Previous serological studies (*20*) showed that identical antibodies could be produced in rabbit blood by intravenous injections of saline suspensions of viable and killed organisms, and by Berkefeld filtrates of 24- and 48-hour and 7-day tryptose broth cultures. No such antibodies were present in the blood of normal nonimmunized rabbits. The agglutinin titer of the serum tended to decrease with increasing length of time after the last injection of the antigen.

In order to determine whether the various cultures could be separated into distinct serological groups, serums were prepared against 4 type 1 cultures and 1 type 3 culture. Saline suspensions prepared from 24-hour potato carrot dextrose agar slant cultures and containing about one billion killed organisms per cc. were used. The animals were immunized by injecting gradually increasing doses of antigen, usually on alternate days throughout a 2-week period. Blood was drawn by cardiac puncture 3 or 4 days after the last injection. The serum was tested for agglutinins by dilution in the usual manner with sterile physiological saline throughout a range from 1:10 to 1:5,120. Five-tenths cc. of antigen, consisting of filtered, standardized, uniform suspensions of 18- to 24-hour potato carrot dextrose agar slant cultures of the organisms to be tested, was added to each dilution. After thorough mixing, all agglutination tubes were incubated in a constant temperature bath at 37° C. for 2 hours, followed by refrigeration at 5° C. overnight. The highest titer obtained was 1 plus at a serum dilution of 1:5,120.

Approximately 80 cultures were tested against the 5 serums. Those cultures which agglutinated to a titer of 1 plus in the 1:5,120 dilution were considered to be homologous. The results listed below indicate the high degree of serological heterology prevailing among the cultures regardless of biochemical type.

Sixteen type 1 cultures were found to be homologous with the first type 1 serum; 18 type 1 cultures were homologous with the second type 1 serum; and 3 type 1 cultures with the third. Five type 1 and 2 type 2 cultures were homologous with the fourth type 1 serum. Two type 3, 1 type 2, and 1 type 1 culture were homologous with the type 3 serum. One type 2 culture was homologous with both a type 1 serum and a type 3 serum. Many of the other cultures, although not homologous, showed marked agglutination with all the serums in the low dilutions, sometimes to a titer as high as 1 plus in the 1:1,280 dilution. In view of the tendency toward cross agglutination, the attempt to separate the cultures into distinct serological groups was abandoned. Agglutinin absorption tests were not performed. It has been shown that encapsulated strains of *B. aerogenes* differ serologically but become antigenically the same when decapsulated (*9*). Further work may prove this to be true for strains of *A. cloacae* also.

Toxin production.—Shwartzman tests and Dolman and Hammon tests (*20*) showed that a heat-stable, endotoxic substance is liberated by type 1 organisms. This endotoxic substance can be neutralized by homologous immune serum.

PATHOGENICITY AND TOXICITY

The type 1 organism has a very low pathogenicity for experimental animals. Kittens, hamsters, guinea pigs, monkeys, rabbits, and chickens exposed to dust from low-grade stained cotton (plate count 100,000,000 per gram) for one or more 7-hour periods showed no symptoms. Intranasal application of growth from 24-hour potato carrot dextrose agar slants into several species of animals did not produce ill effects. Subcutaneous injection of viable cultures into rabbits caused abscess formation from which the organisms could be recovered. Massive doses of viable organisms were required to kill mice and guinea pigs when injected intraperitoneally. Toxic filtrates (Berkefeld filtrates of 7-day tryptose phosphate broth cultures), viable cultures, and heat-killed cultures, respectively, were administered in amounts ranging from 0.25 to 1.0 cc. to 14-day-old chicks intradermally, intraperitoneally, intravenously, and by gavage without producing any noticeable symptoms. Gross autopsy findings were normal on birds that were sacrificed and examined.

Rabbits were killed by intravenous injections of sterile filtrates of 7-day tryptose broth cultures. The lethal dosage varied considerably, ranging from 0.02 to 0.5 cc. per kg. of body weight.

Human beings were made acutely ill by inhaling for 10 minutes dust from cotton of the same lot as that to which animals were exposed. The typical organisms were recovered from the upper respiratory tract by swabs streaked on potato carrot dextrose agar immediately after exposure to the cotton dust; however, the organisms could not

be recovered by this method 24 to 48 hours later. The organisms were not isolated from the blood stream of approximately 40 individuals who had had the acute illness. The same type of illness could also be caused in human beings by inhalation of sterile filtrates of 7-day tryptose broth cultures. One-tenth cc. of such filtrates injected intradermally into human beings caused severe cutaneous reactions and systemic symptoms within 3 hours.

As reported previously (*20*), the type 1 organisms did not infect cotton seedlings. Further work to determine whether this type would attack cotton bolls was carried out. Bolls averaging an inch in diameter were inoculated according to the method of Hopkins (*8*) with saline suspensions of 18- to 24-hour potato carrot dextrose agar slant cultures of *A. cloacae*, type 1, of *A. aerogenes*, and with sterile distilled water, respectively. Inoculated bolls continued to grow, and none fell from the plants. Bolls were harvested 1 and 2 weeks after inoculation and after the plants had been killed by frost, and examined as follows: Each boll was dipped into 0.1-percent mercuric chloride and then divided crosswise with a sterile scalpel. One gram of individual sections of seed and fiber were analyzed quantitatively for bacterial content and representative colonies were picked from plates and examined biochemically.

Externally, the inoculated bolls had the same appearance as the uninoculated bolls. Internally, at the site of inoculation, the boll wall was yellow or darkened, the immature fibers were yellow, and the seed coats brown. Usually only the section of the boll directly inoculated and one or two adjacent sections were attacked. The typical organisms injected in each case could be recovered in enormous numbers from the infected fibers. Microscopic examination showed the organisms growing in and on the fibers. Uninoculated bolls were sterile; those inoculated with sterile distilled water usually showed a mixed bacterial flora. On the basis of this work it would seem that organisms of the genus *Aerobacter* are saprophytic in cotton bolls, which offer a favorable medium for their development.

It was concluded that these strains of *A. cloacae* are mildly pathogenic for experimental animals, toxic to rabbits and human beings, and not pathogenic for cotton plants.

COMPARISON WITH CULTURES OF *A. CLOACAE* FROM AMERICAN TYPE CULTURE COLLECTION

Four cultures of *A. cloacae*, Nos. 222, 529, 961, and 962, were obtained from the American Type Culture Collection and tested biochemically in the media described above. Culture 222, submitted by Jordan, who originally described the species, was identical biochemically with the type 2 strain. Culture 529 was nonmotile, the

individual organisms were rather long and in chains. Its Imvic was $--++$; it fermented glycerol with acid production and liquefied gelatin. It was, however, rather inactive on most of the carbohydrate media and it did not reduce nitrates to nitrites. Cultures 961 and 962 were almost identical biochemically. Both, however, present different biochemical reactions now than those described by Levine (*11*). According to the scheme of classification presented herein they would be grouped as type 4. None of the four cultures was mucoid, even after repeated transfers on potato carrot dextrose agar, and none produced yellow pigment. All four cultures tested against two type 1 serums agglutinated in low titers.

DISCUSSION

The strains of *A. cloacae*, types 1, 2, and 3 described, differ from each other biochemically only in their ability to ferment dulcitol, inositol, and sorbitol. Type 4 cultures differ from each other in their ability to ferment a number of the common carbohydrate test substances. Over a period of 2 years during which 107 cultures, representing all 4 types, have been studied in the laboratory, the biochemical reactions of each culture, except type 4 organisms, have remained constant. Pigment production by type 1 cultures at temperatures ranging from 5° to 37° C. and the property of mucoid growth by all types on solid media containing glucose have also remained constant. A comparison of these cultures with 4 type cultures of *A. cloacae* (Nos. 222, 961, 962, and 529) obtained from the American Type Culture Collection showed that types 1, 2, and 3 closely resembled type culture No. 222 except for the following characteristics: Type 1 cultures fermented dulcitol, produced pigment, and showed mucoid growth on dextrose agar; type 2 cultures were identical with No. 222 except for mucoid growth on dextrose agar; type 3 cultures differed from each other in their reactions on dulcitol and sorbitol and in pigment production; they were always mucoid on dextrose agar. Type 4 cultures were similar to type cultures No. 961 and No. 962 except for mucoid growth and pigment production. It would seem, therefore, that the characteristics of pigment production and/or mucoid growth differentiate the strains under study from strains previously described.

While other investigators have observed pigment production and mucoid growth in organisms of this group, no reference was found in the literature to studies of factors governing pigment production and mucoid growth in *A. cloacae*. In view of the known instability of these characteristics in the case of other organisms, however, it does not seem justifiable to distinguish a separate variety of *A. cloacae* on this basis without further study.

A few type 1 cultures only were tested specifically for toxin production. However, it is logical to assume that types 2, 3, and 4 also produce toxin because these types only could be isolated from a few samples of cotton known to have caused illness. None of the four strains from the American Type Culture Collection evolved a toxic substance that would sensitize rabbits to the toxin produced by the type 1 cultures being studied. In precipitin tests for toxin with immune serum prepared against a type 1 culture, precipitinogens prepared from the four American Type Culture strains did not show a high titer. Since these four strains never developed a mucoid appearance and a toxic substance could not be demonstrated by available test, it is suggested that toxin production by *A. cloacae* may be correlated with the property of mucoid growth.

While slowly decreasing in numbers, the organisms are known to remain viable in baled cotton for at least 3 years. This type of nonsporulating organism does not usually survive such a long time under unfavorable conditions for growth. It has been suggested that the mucilaginous substance microscopically visible around the organisms attached to cotton fibers serves as a protective agent. The relationship, if any, between this mucilaginous substance and toxin production is unknown.

While outbreaks of food poisoning have been attributed to the ingestion of toxic substances contained in products contaminated with *A. cloacae* (*4*, *6*), the illness among workers handling low-grade cotton appears to be the first reported instance of respiratory disease due to the inhalation of such toxic products. Since *A. cloacae* is commonly known to be widely distributed in nature, it might be expected as a major contaminant of organic plant materials offering suitable conditions for its growth such as the fermented fibers of hemp, flax, and jute. During these studies type 1 organisms were isolated from hemp mill dust and from retted hemp plants. Illness similar to that observed in workers handling stained cotton has been reported in hemp, flax, and jute workers (*1*). *A. cloacae* occurs naturally on grains, and workers exposed for several hours to heavy concentrations of grain dust are subject to "grain fever" or "thresher's fever" (*12*), a clinical entity very similar to the acute illness caused by the inhalation of low-grade cotton dust. The type 1 and type 2 strains of *A. cloacae* were found to occur in large numbers in grain elevator screenings. Recently a syndrome has been described in workers exposed to dust from bagasse (sugar cane fiber) for which no cause has been directly ascribed (*5*). It is thought that bagasse with a suitable sugar content would offer a favorable medium for this group of organisms.

Finally, an investigation into conditions governing the production of toxin by this group of organisms in materials with which the worker is in close contact during processing is indicated.

SUMMARY AND CONCLUSIONS

A Gram-negative, motile, mucoid, nonsporulating, rod-shaped micro-organism was found to occur in large numbers in low-grade, stained cotton, which caused illness among workers; the same organism was also found in large numbers in dust from cotton mills, hemp mills, and grain elevators. Workers exposed to hemp dust or grain dust are known to suffer from an illness similar to that described in workers in low-grade cotton.

An intensive study was made of 107 cultures isolated from samples of raw cotton, cotton seed, cotton mill dust, elevator dust screenings, hemp mill dust, and retted hemp plants, and from patients in cases of illness.

The organisms were slow lactose fermenters, their Imvic reaction was − − + +; most of the cultures isolated actively attacked the usual carbohydrate test substances except adonitol, inositol, and inulin; they produced only acid in glycerol and liquefied gelatin; they gave a characteristic heavy mucoid growth on dextrose agar; and under suitable conditions most of them produced yellow pigment. According to Bergey's Manual, fifth edition, the Imvic reaction, gelatin liquefaction, and lack of active glycerol fermentation are characteristic of *Aerobacter cloacae* as distinguished from *A. aerogenes*. The organisms referred to in previous papers as the "cotton bacterium" were therefore classified as *A. cloacae*. There did not appear to be sufficient difference between the strains studied and cultures of *A. cloacae* obtained for comparison from the American Type Culture Collection to justify classifying these strains as a new variety of *A. cloacae*.

Four types were arbitrarily differentiated on the basis of biochemical tests: Type 1 cultures produced yellow pigment and fermented dulcitol and sorbitol but not inositol; type 2 cultures produced white growth and fermented sorbitol but not inositol or dulcitol; type 3 cultures were white or yellow, fermented inositol but usually not dulcitol and sorbitol; type 4 cultures varied widely in fermentation reactions on the various carbohydrates. Type 1, 2, and 3 cultures fermented saccharides rapidly with reversion of the reaction of the medium.

Type 1 cultures produced an endotoxin capable of causing illness in human beings when inhaled, although the bacteria themselves did not appear to survive longer than 48 hours in the human respiratory tract. They had a low pathogenicity for laboratory animals. Small

doses of the endotoxin injected intravenously killed rabbits but not mice or chickens.

Antibodies could be produced in rabbits by intravenous injections of either the endotoxic substance or killed cultures. The cultures tested against immune rabbit serums appeared to be heterologous although a considerable degree of cross agglutination appeared in low dilutions.

The organisms were not pathogenic when inoculated into cotton seedlings but were saprophytic in immature cotton bolls into which they were introduced.

ACKNOWLEDGMENTS

Grateful acknowledgment is made to Dr. Charles Thom for his suggestions regarding the examination of cotton fibers, Mr. D. E. Rushing and Dr. Frederick H. Goldman for identification and analyses of gases produced from dextrose, and Dr. Ida A. Bengtson for her criticism and suggestions in the preparation of the manuscript.

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A SOAP WHICH INDICATES THE PRESENCE OF MERCURY FULMINATE[1]

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To help reduce the incidence of mercury fulminate dermatitis in the explosives industry (*1*) a liquid soap has been developed which indicates, by a change in color, the presence of traces of mercury fulminate upon the skin. This reagent soap has the following composition:

Diphenylthiocarbazone	0.18 gm.
Triethanolamine (technical)	250 cc.
Liquid soap	750 cc.
Hydroquinone	0.015 gm.

The soap is orange in color. In the presence of traces of mercury salts it changes rapidly to a deep, easily recognizable purple.

EXPERIMENTAL

Preparation.—Diphenylthiocarbazone, which is obtainable from most chemical supply houses as "dithizone" reagent, is added to the triethanolamine and the mixture rotated or gently shaken without warming until the solution is complete. The technical triethanolamine used in these experiments was colorless and had the following composition:

Triethanolamine, not less than 80 percent.
Diethanolamine, not more than 15 percent.
Ethanolamine, not more than 2.5 percent.

To this mixture is added the hydroquinone dissolved in the commercial liquid soap preparation, which, in our experiments, met the Government purchase specifications P–S–618[2] and contained no extraneous substances reacting with diphenylthiocarbazone in triethanolamine solution.

Mode of action.—Fundamental to the success of any reagent soap are rapidity of reaction, sensitivity, stability, detergency, clarity of color changes, and innocuous nature. In the experiments leading to the development of the triethanolamine-diphenylthiocarbazone re-

[1] From the Dermatoses Investigations Section, Division of Industrial Hygiene, National Institute of Health.
[2] Federal Standard Stock Catalogue, section IV, part 5.

agent a number of other reagents for mercury fulminate were tested. These failed because, from the point of view of utility in a reagent soap, the reactions were much too slow (e. g., with potassium ferricyanide), because they required toxic chemicals (e. g., phenylhydrazine), or because a positive test resulted in changes which could be observed only by the technically trained eye.

A means of bringing mercury fulminate into solution was first sought as a general method of speeding test reactions. Technical triethanolamine was found satisfactory for this purpose; its inclusion in the formula of the reagent soap is based upon the work of Majrich (*2*) in which the ethanolamines are shown to be solvents for mercury fulminate. It was then found that diphenylthiocarbazone in triethanolamine solution changes color strikingly and sensitively in the presence of mercury ion, and this indicating system was accordingly incorporated into the soap.

Sensitivity.—Since under working conditions mercury fulminate is spread over or embedded in the skin rather than dissolved in it, it was necessary to determine the sensitivity of the reagent soap in terms of concentration of mercury ions per unit of skin area required to give the test, rather than the more common concentration per unit volume. This was accomplished by employing test papers on which a known and mechanically fixed area contained a known amount of mercury salt (mercuric chloride) (*3*). By this technique it was shown that one drop, or about 0.05 cc., of reagent soap solution will indicate the presence of 2γ (0.000002 gm.) of mercury ion per square centimeter. This extreme sensitivity is not applicable to skin surfaces because it requires comparison with controls; however, the results with 10 γ were unequivocal and applicable to the detection of mercury ions upon the skin.

It is evident that a practical industrial indicating soap must produce changes which require little judgment to evaluate on the part of the worker. The concentration of diphenylthiocarbazone used in the reagent soap was determined by testing graduated concentrations on the hands of workers on a fuse line where mercury fulminate was used in a primer mix, with antimony sulfide, potassium chlorate, and ground glass. The concentration of diphenylthiocarbazone recommended here produced color changes clearly perceptible to these workers without staining their hands.

Effect upon skin and hair.—The degree of staining of the skin in this case depends upon the concentrations of both diphenylthiocarbazone and mercury fulminate. With the concentration of reagent given even high concentrations of mercury fulminate upon the skin will produce no staining, although deeply embedded particles may result in a fugitive tattoo. Higher concentrations of diphenylthiocarbazone, e. g.,

0.25 gm. per liter of soap, regularly produced staining even with traces of mercury fulminate.

High concentrations of the mercury-diphenylthiocarbazone complex will perceptibly color only the lightest shades of hair; however, this may be interpreted as a contraindication to the regular use of the reagent soap as a shampoo.

The use of technical triethanolamine upon the skin in a number of dermatological preparations has been reported (*4*) and no skin hazard is to be anticipated from this source.

Stability.—The auto-oxidation of diphenylthiocarbazone in alkaline solution is an established phenomenon (*5*). We have observed, however, that in the reagent soap a decrease in the content of triethanolamine from 25 percent to 5 percent increases the rate of auto-oxidation about 10 times, i. e., 100 cc. samples in full, stoppered bottles, and not containing hydroquinone, lose their potency completely in 10 days and 1 day, respectively. A solution of diphenylthiocarbazone in 25 percent triethanolamine and 75 percent water is perfectly stable for several weeks under these conditions. It is a fair conclusion, therefore, that the soap is the cause of the rapid degradation of the mercury reagent. This is perfectly consistent with the strong tendency of unsaturated fatty acids (present in liquid soaps as their sodium or potassium salts) to form peroxides, which in this case catalyse the oxidation of diphenylthiocarbazone. To overcome this action, hydroquinone was added as an antioxidant (*6*). In this manner the stability of the reagent soap was extended to six weeks. Its reactivity may then be renewed by the addition of fresh diphenylthiocarbazone.

Precautions and limitations.—It has been shown that diphenylthiocarbazone gives characteristic colorations with a number of ions which may be divided into groups according to whether the test is carried out under basic or acidic conditions (*7*). The accompanying list (table 1) reviews those ions which give positive tests under basic conditions.

TABLE 1.—*The colors of the metal-diphenylthiocarbazone compounds in CCl_4*

[One solvent is given for the sake of consistency; in the several cases in which the colors are known both in CCl_4 and water (Hg^{++}, Ag^{+}, Cu^{++}, Ni^{++}, Co^{++}) they are the same and it is probable that this similarity obtains throughout the list.]

Ion	pH	Color in CCl_4	Ion	pH	Color in CCl_4
Cu^{++}	Alkaline	Green brown.	Ag^{+}	Alkaline	Violet.
Au^{+}	do	Red.	Zn^{++}	Weak alkaline	Red purple.
Hg^{+}	Weak alkaline	Violet.	Tl^{+}	9-12	Red.
Pb^{++}	8-10	Red.	Bi^{+++}	7-9	Orange.
Sn^{++}	6-8	Purple red.	Mn^{++}	11	Brown red.
Co^{++}	7-9	Violet.	Ni^{++}	Weak	Brown.
Cd^{++}	5 percent NaOH	Red.			

Any of these ions may be expected to interfere with the effectiveness of the soap, and their presence in either metal soap dispenser parts or primer parts which are constantly being handled may be

sufficient to discolor the soap. In using this reagent cleanser it is therefore suggested that, after it is certain that the local tap water does not contain interfering amounts of any of these metals, the workers be instructed to wash with it until it retains its original color. The skin will then be free of mercury and of any of the interfering ions.

SUMMARY

A soap solution which is a reagent for mercury fulminate is described. The active ingredients of this reagent soap are triethanolamine and diphenylthiocarbazone.

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DEATHS DURING WEEK ENDED JULY 17, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 17, 1943	Corresponding week, 1942
Data for 88 large cities of the United States:		
Total deaths	7,782	7,690
Average for 3 prior years	7,342	
Total deaths, first 28 weeks of year	259,350	235,281
Deaths under 1 year of age	583	539
Average for 3 prior years	490	
Deaths under 1 year of age, first 28 weeks of year	17,958	15,168
Data from industrial insurance companies:		
Policies in force	65,631,999	64,948,767
Number of death claims	12,255	10,029
Death claims per 1,000 policies in force, annual rate	9.7	8.1
Death claims per 1,000 policies, first 28 weeks of year, annual rate	10.2	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 24, 1943

Summary

An increase was again recorded in the incidence of poliomyelitis. A total of 329 cases was reported, as compared with 297 last week and a 5-year (1938–42) median of 124. Of the current total, 249 cases, or 76 percent, were reported in three States, as follows (last week's figures in parentheses): California, 111 (90); Texas, 96 (102); Oklahoma, 42 (39). The combined reports of these States have constituted, for the past 3 weeks, 84, 85, and 78 percent of the respective weekly totals, and for the first 29 weeks of the year 67 percent (1,312 cases) of the total of 1,955 cases in the country as a whole.

Meningococcus meningitis incidence decreased from 264 cases for the preceding week to 237 for the current week, notwithstanding increases of from 6 to 10 cases each in Illinois, Michigan, and California and minor increases in some other States. The 5-year median for the current week is 34 cases.

Current weekly totals reported for diphtheria, influenza, measles, and whooping cough were above the corresponding 5-year medians, while those for scarlet fever, smallpox, and typhoid fever were below.

Cumulative figures for the diseases included in the table for the first 29 weeks of the year (figures for the corresponding period of 1942 in parentheses) are as follows: Anthrax, 37 (51); diphtheria, 6,615 (6,765); dysentery, all forms, 12,371 (7,884); infectious encephalitis, 336 (258); influenza, 79,477 (79,322); leprosy, 17 (32); measles, 528,294 (461,421); meningococcus meningitis, 12,779 (2,188); poliomyelitis, 1,955, (875); Rocky Mountain spotted fever, 258 (277); scarlet fever, 94,785, (86,642); smallpox, 596 (596); tularemia, 534 (574); typhoid and paratyphoid fever 2,424 (3,116); endemic typhus fever, 1,638 (1,271); whooping cough, 118,067 (109,174).

Deaths in 88 large cities of the United States totaled 7,532 for the current week as compared with 7,416 for the preceding week and a 3-year (1940–42) average of 7,568. The cumulative total for the first 29 weeks of the year is 253,067, as compared with 229,645 for the same period of 1942.

Telegraphic morbidity reports from State health officers for the week ended July 24, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended— July 24, 1943	Week ended— July 25, 1942	Median 1938–42	Week ended— July 24, 1943	Week ended— July 25, 1942	Median 1938–42	Week ended— July 24, 1943	Week ended— July 25, 1942	Median 1938–42	Week ended— July 24, 1943	Week ended— July 25, 1942	Median 1938–42
NEW ENGLAND												
Maine	0	0	1	------	------	------	43	26	26	0	2	0
New Hampshire	0	0	0	------	------	------	5	0	2	1	0	0
Vermont	0	0	0	------	------	------	65	57	25	1	1	0
Massachusetts	6	2	2	------	------	------	222	185	207	11	2	0
Rhode Island	0	0	0	1	------	------	73	38	29	5	0	0
Connecticut	0	0	1	------	1	1	69	83	49	7	0	0
MIDDLE ATLANTIC												
New York	9	4	10	[1] 2	[1] 4	[1] 2	668	184	491	26	9	4
New Jersey	0	2	3	3	2	2	513	122	122	11	0	1
Pennsylvania	6	9	9	------	------	------	92	98	201	22	3	3
EAST NORTH CENTRAL												
Ohio	7	2	7	5	8	4	156	73	58	7	0	0
Indiana	2	4	4	3	------	3	48	14	14	0	1	1
Illinois	10	9	15	12	4	4	232	44	58	16	1	1
Michigan [2]	2	2	3	2	1	------	793	105	241	15	0	0
Wisconsin	1	8	2	7	12	9	468	280	373	4	0	0
WEST NORTH CENTRAL												
Minnesota	5	1	1	------	2	1	105	40	23	0	0	0
Iowa	1	0	1	------	------	------	24	57	53	0	1	0
Missouri	4	2	4	------	1	------	29	8	8	11	0	0
North Dakota	0	4	2	------	2	------	40	10	8	0	0	0
South Dakota	0	1	1	------	------	------	7	10	3	1	0	0
Nebraska	4	1	0	1	4	------	10	6	6	0	1	0
Kansas	0	2	2	1	1	1	52	23	23	2	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	2	1	4	0	0	0
Maryland [2]	0	6	1	2	1	1	58	15	15	7	4	2
District of Columbia	0	0	1	------	------	------	34	8	8	1	0	0
Virginia	7	11	10	39	24	20	46	13	47	10	7	1
West Virginia	4	1	3	2	------	1	88	5	6	0	0	0
North Carolina	4	1	7	------	------	------	37	19	51	7	0	0
South Carolina	12	0	3	133	92	78	14	16	13	4	0	0
Georgia	4	1	3	10	8	9	10	7	7	2	2	1
Florida	4	3	3	9	4	4	10	11	10	1	0	0
EAST SOUTH CENTRAL												
Kentucky	1	1	3	1	------	------	19	3	24	0	1	2
Tennessee	4	3	2	3	8	12	16	27	27	6	0	0
Alabama	1	4	5	31	11	11	27	9	26	5	3	3
Mississippi [2]	2	8	7	------	------	------	------	------	------	3	0	0
WEST SOUTH CENTRAL												
Arkansas	4	3	3	------	5	10	11	31	22	4	0	0
Louisiana	12	1	5	6	1	4	5	8	4	3	0	0
Oklahoma	3	2	2	2	4	4	9	6	6	3	0	0
Texas	23	27	22	231	79	74	101	94	94	4	3	1
MOUNTAIN												
Montana	0	0	0	------	9	1	65	25	25	0	0	0
Idaho	0	0	0	2	------	------	4	34	3	0	0	0
Wyoming	0	0	0	------	15	------	8	13	3	0	0	0
Colorado	3	2	10	2	13	5	9	39	24	0	1	0
New Mexico	0	1	1	1	2	------	8	0	8	0	0	0
Arizona	0	5	3	31	1	13	12	7	14	1	0	0
Utah [2]	0	0	0	------	------	------	33	102	37	1	0	0
Nevada	0	0	------	------	------	------	5	9	------	1	0	------
PACIFIC												
Washington	6	1	1	------	------	------	36	177	22	4	0	0
Oregon	7	1	1	5	5	5	32	47	36	7	1	0
California	11	7	15	37	3	11	288	550	277	23	2	1
Total	169	137	148	584	327	318	4,701	2,739	3,126	237	45	34
29 weeks	6,615	6,765	8,192	79,477	79,322	150,548	528,294	461,421	461,421	12,779	2,188	1,303

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 24, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	July 24, 1943	July 25, 1942		July 24, 1943	July 25, 1942		July 24, 1943	July 25, 1942		July 24, 1943	July 25, 1942	
NEW ENGLAND												
Maine	0	1	0	16	1	5	0	0	0	0	0	1
New Hampshire	0	0	0	2	0	1	0	0	0	0	0	0
Vermont	0	2	0	2	0	2	0	0	0	0	1	0
Massachusetts	0	3	1	93	64	87	0	0	0	8	1	1
Rhode Island	1	0	0	10	0	3	0	0	0	0	0	0
Connecticut	2	0	1	18	4	12	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York	10	2	4	79	74	84	0	0	0	8	9	12
New Jersey	0	4	1	19	16	24	0	0	0	3	2	5
Pennsylvania	2	3	8	41	42	77	0	0	0	6	10	15
EAST NORTH CENTRAL												
Ohio	2	1	1	47	79	51	0	0	0	39	18	8
Indiana	1	4	1	10	5	14	0	0	2	3	2	7
Illinois	7	12	5	37	43	63	2	0	1	5	3	11
Michigan [2]	1	7	7	26	39	76	2	1	1	45	1	3
Wisconsin	1	0	0	49	34	34	0	1	2	0	0	0
WEST NORTH CENTRAL												
Minnesota	0	0	0	10	42	27	0	0	0	0	1	0
Iowa	0	1	1	8	7	12	1	0	3	0	0	4
Missouri	4	2	1	10	15	12	0	0	3	5	2	12
North Dakota	0	1	1	0	2	3	0	0	3	0	0	0
South Dakota	0	0	0	5	11	6	0	0	1	0	1	0
Nebraska	1	0	1	4	1	3	0	1	1	0	1	0
Kansas	7	2	0	18	10	18	0	0	0	1	5	5
SOUTH ATLANTIC												
Delaware	0	0	0	1	3	1	0	0	0	0	0	0
Maryland [2]	1	0	0	21	13	10	0	0	0	2	3	6
District of Columbia	0	0	0	8	7	1	0	0	0	0	0	0
Virginia	2	3	2	8	4	11	0	0	0	2	10	10
West Virginia	0	2	2	13	21	13	0	0	0	8	14	12
North Carolina	3	2	2	6	10	10	0	0	0	3	12	12
South Carolina	2	3	3	5	1	2	0	0	0	8	5	15
Georgia	1	4	4	11	7	10	0	0	0	14	26	24
Florida	0	1	1	1	0	3	0	0	0	3	1	4
EAST SOUTH CENTRAL												
Kentucky	0	20	4	7	20	15	1	0	0	9	17	17
Tennessee	0	11	2	18	14	11	0	0	0	6	23	23
Alabama	0	3	3	10	5	6	0	0	0	12	8	8
Mississippi [2]	0	5	3	2	8	5	0	0	0	14	5	7
WEST SOUTH CENTRAL												
Arkansas	6	15	1	9	1	2	0	0	0	9	19	26
Louisiana	10	3	3	2	3	5	0	0	0	7	14	17
Oklahoma	42	0	0	6	9	9	0	0	0	3	12	12
Texas	96	2	3	18	17	17	2	0	0	25	28	43
MOUNTAIN												
Montana	0	0	0	4	2	6	0	0	0	1	2	0
Idaho	0	0	0	0	4	2	0	0	0	0	1	1
Wyoming	0	0	0	7	0	1	0	0	0	1	0	0
Colorado	5	0	0	23	9	9	0	0	1	1	3	4
New Mexico	2	1	1	0	1	3	1	0	0	5	3	3
Arizona	4	0	0	8	1	3	3	0	1	3	1	2
Utah [2]	0	0	0	7	4	6	0	0	0	0	3	2
Nevada	0	0	------	0	0	------	0	0	------	0	1	------
PACIFIC												
Washington	2	0	0	18	4	11	0	0	0	0	3	2
Oregon	3	3	0	6	1	4	0	0	1	1	0	2
California	111	1	8	99	34	42	0	0	1	4	3	6
Total	329	124	124	807	692	814	12	3	29	264	269	345
29 weeks	1,955	875	1,067	94,785	86,642	113,489	596	596	1,872	2,424	3,116	3,444

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 24, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended— July 24, 1943	Whooping cough: Week ended— July 25, 1942	Whooping cough: Median 1938–42	Week ended July 24, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	64	22	28	0	0	0	0	0	0	0	0	0
New Hampshire	0	4	4	0	0	0	0	0	0	0	0	0
Vermont	10	50	20	0	0	0	0	0	0	0	0	0
Massachusetts	66	141	132	0	0	0	0	2	0	0	0	0
Rhode Island	43	22	15	0	0	0	0	0	0	0	0	0
Connecticut	27	67	51	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	269	341	341	0	1	11	0	0	0	0	0	0
New Jersey	184	254	254	0	0	0	0	0	0	2	0	0
Pennsylvania	255	274	336	0	0	0	0	0	0	1	0	0
EAST NORTH CENTRAL												
Ohio	193	183	183	0	0	1	0	0	0	1	0	0
Indiana	61	49	30	0	0	0	0	0	0	1	0	0
Illinois	223	415	363	0	2	1	0	3	0	2	1	0
Michigan [2]	354	170	269	0	1	4	0	0	0	0	0	0
Wisconsin	304	243	243	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	85	39	39	0	1	0	0	0	0	0	1	0
Iowa	47	30	30	0	0	0	0	0	0	0	0	0
Missouri	36	38	49	0	0	0	0	0	0	1	0	0
North Dakota	35	4	10	0	0	0	0	0	0	1	0	0
South Dakota	4	0	10	0	1	0	0	0	0	0	0	0
Nebraska	9	8	13	0	0	0	0	0	0	0	0	0
Kansas	58	47	53	0	0	0	0	0	0	0	2	0
SOUTH ATLANTIC												
Delaware	0	2	5	0	0	0	0	0	0	5	0	0
Maryland [2]	112	46	57	0	0	0	2	1	0	3	1	0
District of Columbia	54	21	13	0	0	0	0	0	0	0	0	0
Virginia	103	46	76	0	0	0	439	0	0	4	0	0
West Virginia	71	20	26	0	0	0	0	0	0	0	0	1
North Carolina	268	146	239	0	0	12	0	0	0	5	0	2
South Carolina	131	49	49	0	0	46	0	0	0	0	2	10
Georgia	28	28	46	0	1	22	0	0	0	0	0	35
Florida	12	19	19	0	3	1	0	0	0	0	0	9
EAST SOUTH CENTRAL												
Kentucky	57	84	49	0	0	25	0	0	0	0	0	0
Tennessee	66	34	48	0	1	0	17	0	0	3	1	1
Alabama	54	27	27	0	0	0	0	0	0	1	0	17
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	2
WEST SOUTH CENTRAL												
Arkansas	25	32	23	0	4	36	0	0	0	0	2	1
Louisiana	7	11	26	0	1	28	0	0	1	0	0	2
Oklahoma	18	4	19	0	0	0	0	0	0	0	0	0
Texas	336	164	164	0	89	409	0	0	0	0	3	50
MOUNTAIN												
Montana	36	27	6	0	0	0	0	0	0	0	0	0
Idaho	5	6	6	0	0	0	0	0	0	1	0	0
Wyoming	4	6	7	0	0	0	0	1	0	3	3	0
Colorado	9	15	28	0	0	1	0	1	0	0	0	0
New Mexico	4	13	19	0	0	1	1	0	0	0	0	0
Arizona	30	3	13	0	0	0	28	0	0	0	0	0
Utah [2]	66	19	50	0	0	0	0	0	0	0	0	0
Nevada	0	4	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	70	49	49	0	0	0	0	0	0	0	0	0
Oregon	56	17	23	0	0	0	0	0	0	0	0	0
California	242	146	240	0	1	21	0	5	0	1	0	1
Total	4,191	3,439	4,061	0	106	619	487	13	1	35	16	131
29 weeks	118,067	109,174	113,405	37	1,154	8,128	3,089	336	17	258	534	1,638
29 weeks, 1942	------	------	------	51	581	4,380	2,923	258	32	277	574	1,271

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 7; New York, 1; Illinois, 2; Michigan, 40; Florida, 1; Texas, 2; California, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 10, 1943

This table lists the reports from 83 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	1		0	12	2	2	0	0	0	0	6
New Hampshire:												
Concord	0	0		0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0		0	76	2	10	0	57	0	0	15
Fall River	0	0		0	14	1	0	0	1	0	1	5
Springfield	0	0		0	16	2	0	1	7	0	0	0
Worcester	0	0		0	2	0	3	0	2	0	0	8
Rhode Island:												
Providence	0	6		1	90	0	0	0	4	0	0	10
Connecticut:												
Bridgeport	0	0		0	0	0	0	0	0	0	0	1
Hartford	1	0		0	2	0	3	0	3	0	1	6
New Haven	0	0		0	15	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0		0	2	1	4	0	4	0	0	4
New York	11	3	1	1	522	26	39	3	44	0	1	74
Rochester	0	0		0	14	0	2	0	2	0	0	9
Syracuse	0	0		0	15	0	1	0	2	0	0	15
New Jersey:												
Camden	0	0		0	0	0	0	0	1	0	0	0
Newark	0	0		0	49	0	2	0	3	0	0	38
Trenton	0	0		0	0	0	2	0	1	0	0	3
Pennsylvania:												
Philadelphia	0	0		2	81	8	19	0	14	0	1	83
Pittsburgh	2	1		0	4	3	5	0	5	0	0	20
Reading	0	0		0	3	0	0	0	0	0	0	9
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0		0	7	3	1	0	4	0	0	7
Cleveland	6	0		0	11	4	5	0	16	0	0	63
Columbus	0	0		0	12	1	0	0	4	0	1	2
Indiana:												
Fort Wayne	0	0		0	4	0	0	0	1	0	0	0
Indianapolis	0	0	7	0	0	0	2	0	5	0	0	6
South Bend	0	0		0	5	0	0	0	0	0	0	0
Terre Haute	0	0		0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	5	0	1	0	166	5	12	2	20	0	1	67
Springfield	0	0		0	1	0	1	0	1	0	0	3
Michigan:												
Detroit	0	0		0	241	4	5	1	14	0	0	50
Flint	0	0		0	3	0	0	0	0	0	0	7
Grand Rapids	0	0		0	76	0	1	0	4	0	0	10
Wisconsin:												
Kenosha	0	0		0	1	0	0	0	5	0	0	2
Milwaukee	0	0		0	133	1	0	0	13	0	0	35
Racine	0	0		0	4	1	0	0	0	0	0	3
Superior	1	0		0	30	0	0	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	1	0		0	72	0	0	0	0	0	0	4
Minneapolis	0	0		0	5	1	1	1	7	0	0	1
St. Paul	0	0		0	11	0	5	0	6	0	0	42
Missouri:												
Kansas City	0	0		0	24	1	5	0	10	0	0	11
St. Joseph	0	0		0	0	0	0	0	1	0	0	0
St. Louis	1	0		0	12	3	8	0	4	0	0	22
Nebraska:												
Omaha	0	0		0	1	1	5	0	1	0	0	0
Kansas:												
Topeka	0	0		0	8	0	0	0	1	0	0	12
Wichita	0	0		0	7	0	2	3	0	0	0	14

City reports for week ended July 10, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0		0	3	1	0	0	0	0	0	6
Maryland:												
Baltimore	0	0	1	0	66	4	3	0	8	0	0	83
Cumberland	0	0		0	0	0	0	0	0	0	0	0
Frederick	0	0		0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0		0	39	5	9	0	9	0	0	88
Virginia:												
Lynchburg	0	0		0	9	0	0	0	0	0	0	19
Richmond	0	0		0	12	0	0	1	0	0	1	38
West Virginia:												
Charleston	0	0		0	0	0	0	0	2	0	1	2
Wheeling	0	0		0	0	0	3	0	0	0	0	18
North Carolina:												
Winston-Salem	0	0		0	0	0	2	0	0	0	0	24
South Carolina:												
Charleston	0	0		0	0	0	0	0	1	0	0	4
Georgia:												
Atlanta	0	0	1	0	2	1	1	0	5	0	0	4
Brunswick	0	0		0	1	0	0	0	0	0	0	0
Savannah	0	0		0	1	2	0	0	1	0	1	1
Florida:												
Tampa	0	0		0	0	0	2	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0		0	4	0	8	0	3	0	1	10
Nashville	0	0		0	4	0	4	0	1	0	0	10
Alabama:												
Birmingham	0	0	1	0	2	0	4	0	0	0	0	5
Mobile	0	0		0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0		0	0	0	1	0	0	0	0	2
Louisiana:												
New Orleans	2	0	7	1	2	0	7	0	1	0	0	5
Shreveport	0	0		0	0	1	2	7	0	0	0	0
Texas:												
Dallas	1	0		0	1	0	4	8	2	0	0	2
Galveston	0	0		0	0	0	3	1	1	0	0	1
Houston	0	0		0	0	1	8	9	1	0	0	3
San Antonio	4	0		1	0	0	5	0	1	0	0	6
MOUNTAIN												
Montana:												
Billings	0	0		0	6	0	2	0	1	0	0	0
Great Falls	0	0		0	9	0	0	0	0	0	0	1
Helena	0	0		0	0	0	0	0	0	0	0	0
Missoula	0	0		0	0	0	0	0	0	0	0	0
Colorado:												
Pueblo	0	0		0	0	0	0	0	4	0	0	5
Utah:												
Salt Lake City	0	0		0	11	0	0	0	6	0	0	38
PACIFIC												
Washington:												
Seattle	4	0		1	48	0	1	0	3	0	0	6
Spokane	1	0		0	8	1	0	0	1	0	0	2
Tacoma	0	0		0	0	0	0	0	0	0	0	0
California:												
Los Angeles	0	0	3	0	75	3	6	8	12	0	0	27
Sacramento	2	0		0	2	1	1	2	2	0	0	8
San Francisco	0	0	2	0	15	2	13	4	10	0	0	8
Total	43	5	24	7	2.071	92	230	51	343	0	10	1,043
Corresponding week, 1942	45	8	14	4	1,377	25	236	16	308	0	6	1,266
Average, 1938-42	57		26	[1] 10	[2] 1,668		[1] 231		425	2	33	1,251

[1] 3-year average, 1940-42.
[2] 5-year median.

Dysentery, amebic.—Cases: San Francisco, 1.
Dysentery, bacillary.—Cases: Buffalo, 5; Baltimore, 1; Charleston, S. C., 29; Nashville, 4; Los Angeles, 2.
Dysentery, unspecified.—Cases: San Antonio, 13.
Tularemia.—Cases: St. Louis, 1; Nashville, 1.
Typhus fever.—Cases: St. Louis, 1; Charleston, S. C., 1; Savannah, 3; New Orleans, 2; Dallas, 1; Houston, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 83 cities in the preceding table (estimated population, 1942, 34,215,500)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
NEW ENGLAND	2.5	2.5	0	2.5	567	17.5	44.9	2.5	184.8	0	5.0	127
MIDDLE ATLANTIC	5.8	1.8	.4	1.3	308	16.9	38.0	1.3	33.9	0	.9	114
EAST NORTH CENTRAL	7.0	0	4.7	0	405	11.1	15.8	1.8	51.4	0	1.2	149
WEST NORTH CENTRAL	4.0	0	0	0	277	11.9	51.4	7.9	59.3	0	0	210
SOUTH ATLANTIC	1.8	0	3.6	0	236	23.1	35.5	1.8	46.2	0	5.3	421
EAST SOUTH CENTRAL	0	0	5.9	0	59	0	71.3	0	23.8	0	5.9	148
WEST SOUTH CENTRAL	20.5	0	20.5	5.9	9	5.9	88.0	73.3	17.6	0	0	56
MOUNTAIN	0	0	0	0	463	0	35.6	0	195.9	0	0	784
PACIFIC	12.2	0	8.7	1.7	259	12.2	36.7	24.5	48.9	0	0	89
Total	6.6	.8	3.7	1.1	316	14.0	35.1	7.8	52.3	0	1.5	159

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 26, 1943.—During the week ended June 26, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		36	3	94	151	26	44	81	100	485
Diphtheria		1	2	13	2		1			19
Dysentery (bacillary)				1						1
Encephalitis (infectious)						1		5		6
German measles		2		8	76	4	6	38	7	141
Influenza		6	4		15	1	3		1	30
Measles	2	90	2	230	963	127	44	244	133	1,835
Meningitis, meningococcus		1		1	2					4
Mumps		89	8	17	238	50	12	50	39	503
Poliomyelitis		1				2				2
Scarlet fever	4	19	8	49	85	33	26	47	21	292
Tuberculosis (all forms)	4	4	1	118	67	30	3	12	34	273
Typhoid and paratyphoid fever		1	1	8	1					11
Undulant fever				1	3	1				5
Whooping cough		20	1	59	104	21	19	21	20	265

Habana—Communicable diseases—4 weeks ended May 29, 1943.—During the 4 weeks ended May 29, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	22		Paratyphoid fever	2	
Malaria	5		Tuberculosis	2	
Measles	17		Typhoid fever	22	4

JAMAICA

Notifiable diseases—4 weeks ended July 3, 1943.—During the 4 weeks ended July 3, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	13	22	Scarlet fever		1
Dysentery	5	2	Tuberculosis	26	105
Erysipelas	1		Typhoid fever	3	36
Leprosy	1	5	Typhus fever	1	
Puerperal septicemia		1			

SWITZERLAND

Notifiable diseases—December 1942.—During the month of December 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	11	Mumps	220
Chickenpox	354	Paratyphoid fever	6
Diphtheria and croup	338	Poliomyelitis	24
Dysentery	22	Scarlet fever	309
German measles	16	Tuberculosis	376
Hepatitis, epidemic	360	Typhoid fever	16
Influenza	69	Undulant fever	2
Measles	248	Whooping cough	99

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–April 1943	May 1943	June 1943—week ended—			
				5	12	19	26
ASIA							
Ceylon	C	47	1	1			
India	C	83,023	5,561	1,854	1,051		
Calcutta	C	854	513	136	154	119	
Madras	C	964					
Vizagapatam	C	4					
India (French)	C	49					
Chandernagor	C	4					
Karikal	C	28					
Pondichery	C	17					

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		January–April 1943	May 1943	June 5	June 12	June 19	June 26
AFRICA							
Basutoland	C	4					
Belgian Congo—Plague-infected rats		P					
British East Africa:							
Kenya	C	11					
Uganda	C	6			2		
Madagascar	C	17					
Morocco (French)	C	124	74		2	2	
Senegal	C		72			[1] 71	
Dakar	C					7	7
Union of South Africa	C	53					
ASIA							
India	C	1,125	82	4	2	1	
Indochina	C	4					
Palestine	C	8		8			
SOUTH AMERICA							
Peru:							
Lambayeque Department	C	2					
Libertad Department	C	12					
Lima Department	C	3					
Lima	C	1					
Plague-infected rats		P					
Piura Department	C	2					
Venezuela.[2]							
OCEANIA							
Hawaii Territory:							
Hamakua District	D	3	1				
Plague-infected rats		51	[3] 12	1			

[1] For the period June 1–20, 1943.
[2] For the period July 1–14, 1943, 7 cases of plague were reported in Venezuela.
[3] Includes 3 plague-infected mice.

SMALLPOX

[C indicates cases; D, deaths]

Place		January–April 1943	May 1943	June 1943—week ended— 5	12	19	26
AFRICA							
Algeria	C	517	56		53		
Angola	C	507					
Basutoland	C	30					
Belgian Congo	C	562	203	121	38		
British East Africa:							
Mombasa	C	3					
Tanganyika	C	11					
Dahomey	C	28	101				
Egypt	C	118	408	122	152	135	146
French Guinea	C	12	114				
Gold Coast	C	5					
Ivory Coast	C	91	10				
Mauritania	C	1					
Morocco (French)	C	522	57				
Mozambique	C	1					
Nigeria	C	2,369	606	188	98	154	
Niger Territory	C	90	66				
Senegal	C	21	6				
Sierra Leone	C	3					
Sudan (French)	C	741	797				
Union of South Africa	C	221					
ASIA							
Ceylon	C	1					
India	C	9,861	4,394	1,023			
India (French)	C	10					
Indochina	C	[1] 2,726			120		
Iran	C	158					
Iraq	C	159	20				
Palestine	C	29					
Syria and Lebanon	C	605	159	10			
Trans-Jordan	C	11					
EUROPE							
Belgium	C	1					
France	C	1					
Germany	C		1				
Scotland	C	1					
Portugal	C	19	4	10		1	
Spain	C	128	7				
Turkey	C	4,975					
NORTH AMERICA							
Canada	C	1					
Guatemala	C	3	1				
Mexico	C	91	19				
SOUTH AMERICA							
Brazil	C	40					
British Guiana	C			1			
Colombia	C	97	23	14	9		
Ecuador	C	10					
Peru	D	8	1				
Venezuela	C	19	5				

[1] Includes the month of May.

TYPHUS FEVER

[C indicates cases]

Place		January–April 1943	May 1943	June 1943—week ended— 5	12	19	26
AFRICA							
Algeria	C	5,395	1,217		282		
Belgian Congo	C	2					
British East Africa:							
Kenya	C	3	2				
Mombasa	C	1					
Uganda	C	1					
Egypt	C	17,826	11,335	1,520	1,160	1,453	1,175
Gold Coast	C	4			1		
Morocco (French)	C	9,691	1,921				
Morocco (Spanish)	C	59	3				
Nigeria	C	2	1	1			
Rhodesia, northern	C	4					
Senegal	C	1	1				
Sierra Leone	C	3					
Union of South Africa	C	778					

TYPHUS FEVER—Continued

[C indicates cases]

Place		January-April 1943	May 1943	June 1943—week ended— 5	12	19	26
ASIA							
Afghanistan	C	520					
China: Shanghai	C	12					
India	C	965	46	6	20		
Iran	C	4,285	1,328				
Iraq	C	752	488	53	23		
Palestine	C	64	93	6	15	11	
Syria and Lebanon	C	15	8	5			
Trans-Jordan	C	12					
EUROPE							
Bulgaria	C	235					
France—Seine Department	C		2				
Germany	C	[1] 800					
Hungary	C	436	160		32		[2] 30
Irish Free State	C	19					
Portugal	C	3	2				
Rumania	C	4,473	1,112	159	176	194	148
Slovakia	C	192	63	19			
Spain	C	230	174				
Turkey	C	1,614	698				
NORTH AMERICA							
Guatemala	C	396	45				
Jamaica	C	9	2			1	
Mexico	C	581					
Puerto Rico	C	2					
SOUTH AMERICA							
Chile	C	110			4		
Ecuador	C	107	19				
Peru	C	5	2				
Venezuela	C	6					
OCEANIA							
Australia	C	30	22				
Hawaii Territory	C	8	2		1		

[1] For the first 7 weeks of 1943.
[2] For 2 weeks.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-April 1943	May 1943	June 1943—week ended— 5	12	19	26
AFRICA							
Belgian Congo:							
Bondo	D	1					
Leopoldville	C		1				
Stanleyville	D	1					
Yanonge	C	1					
Gold Coast: Kibbi	C						[1] 1
Sierra Leone: Freetown	C				[1] 1		
SOUTH AMERICA							
Colombia:							
Cundinamarca Department	D	1					
Intendencia of Meta	D	2					

[1] Suspected.

COURT DECISIONS ON PUBLIC HEALTH

Sewage disposal—stream pollution by city—order of State stream control commission upheld.—(Michigan Supreme Court; *People ex rel. Stream Control Commission* v. *City of Port Huron et al.*, 9 N.W.2d 41; decided April 6, 1943.) The Michigan Stream Control Commission ordered the city of Port Huron to construct a sewage treatment plant to permit treatment of the city's sewage before its discharge into State waters. The city failed to comply with this order and the commission brought a proceeding to enforce its order and to restrain the city from discharging untreated sewage into the Black and St. Clair Rivers. In the lower court there was a decree in favor of the city, and an appeal was taken to the State supreme court.

The latter court took the view that there was sufficient evidence to substantiate the State's contention that the present raw sewage disposal method was a constant menace to the health and well-being of the down-river communities and tourists. According to the court this evidence clearly justified the commission's order and it was no defense to a statutory charge of river-water pollution that others had contributed or were contributing to that condition.

With respect to the doctrine of comparative injury, the appellate court stated that the instant case was not a proper one for the application of that doctrine even if there should be concurrence with the trial court in its conclusion that "a balancing of equities" favored the city. The doctrine "should be confined to those situations where the plaintiff can be substantially compensated" and "should not be invoked to justify the continuance of an act that tends to impair public health."

The city also raised the question of its financial inability to comply with the commission's order but to no avail. After quoting from a New Jersey case in which the same question had been raised and held to be no defense, the supreme court pointed out that the statute creating the commission was under the police power vested in the State and that the order was not arbitrary or unreasonable but became necessary because of the city's previous refusal to stop polluting the rivers.

In holding that the evidence justified the order and in vacating the lower court's decree, the appellate court stated that it was not unmindful of the situation caused by war conditions and of the fact that the city would have difficulty in complying with the commission's order "due to necessary materials now required for war purposes." Proceeding, the court said: "This, however, does not, and should not, prevent the city from immediately taking those steps necessary to insure the carrying out of the mandate of the commission, but a rea-

sonable time should be allowed for completion of the project. We apprehend that the State and city can agree upon the time that is necessary, and if they cannot, this is a matter which can be determined by the trial judge upon proper proofs."

Liability of physician for failure to use prophylactic in infant's eyes at birth.—(Kentucky Court of Appeals; *Walden* v. *Jones*, 158 S.W.2d 609; decided January 13, 1942, rehearing denied March 3, 1942.) An action against a physician was brought by an infant to recover damages for the loss of the plaintiff's eyesight allegedly caused by the negligence of the physician in failing to place nitrate of silver in the plaintiff's eyes at the time of his birth. A jury found for the plaintiff and the judgment entered upon such verdict was appealed from by the defendant.

Regarding the question as to whether negligence was established, the Court of Appeals of Kentucky stated: "Certainly the evidence that the defendant failed to place a prophylactic in the eyes of the newborn child is sufficient to conclusively establish negligence on the part of the physician, in the light of the uncontradicted medical testimony that in all localities physicians ordinarily use silver nitrate or some other prophylactic in the eyes of a child at birth, and that reasonable care and diligence require such to be done." The court concluded that the defendant's negligence was clearly proved and said that under the proof in the case it was not proper to submit to the jury the question as to whether the failure of defendant to drop the prophylactic in the child's eyes constituted an act of negligence.

On the question as to whether the established negligence of the defendant was the proximate cause of the injury, the appellate court's conclusion was that the trial court properly submitted the case to the jury. The judgment of the lower court was, however, reversed because of a statement made in argument by the plaintiff's counsel, which statement was held by the court of appeals to be improper.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

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Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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PREVALENCE OF DISEASE

Public Health Reports

Vol. 58 ○ AUGUST 6, 1943 ● No. 32

EXPERIMENTAL TRANSMISSION OF THE SPOTTED FEVERS OF THE UNITED STATES, COLOMBIA, AND BRAZIL BY THE ARGASID TICK *ORNITHODOROS PARKERI* [1]

By GORDON E. DAVIS, *Senior Bacteriologist, United States Public Health Service*

In a preliminary paper (*1*) the transmission of the causative agent of Rocky Mountain spotted fever by *Ornithodoros parkeri* and the infectivity of the eggs from these ticks were reported. Inasmuch as this tick species is present in nine of the Western States in which spotted fever is endemic and especially since *O. parkeri* and the common vector to man, *Dermacentor andersoni*, have many hosts in common, further studies seemed warranted. Similar studies on the spotted fevers of Colombia and Brazil are also reported.

O. parkeri stock from Montana, Wyoming, California, Washington, Nevada, and Utah were employed, together with 7 human, 1 *Dermacentor andersoni*, and 1 rabbit tick (*Haemaphysalis leporis-palustris*) strain of spotted fever of the United States. Following preliminary experiments, several available strains of spotted fever (U. S. A.) were used for the immunity tests.

Larvae, first nymphs, or, rarely, second nymphs, were used for the infective feedings, as it has been found that ticks in the early developmental stages acquire and maintain the several infectious agents with which we have worked more regularly than the later developmental stages or adults.

SPOTTED FEVER OF THE UNITED STATES

Twelve experiments are reported with 6 to the F1 generation, 2 to the F2, and 1 to the F4 generation.

The two experiments already reported in part were begun in October 1937 and September 1938, respectively. Experiment 1 was terminated by the death or the injection of the ticks. One female caused a typical infection by feeding on a guinea pig 6 months following the infective feeding and a male of the same series by injection at 10 months.

[1] From the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

EXPERIMENT 2

On September 12, 1938, 34 second stage nymphs engorged on a guinea pig ill with spotted fever (fourth day of fever, scrotal swelling present). Following the first test feeding none of the 5 host guinea pigs became infected. At the second test feeding 7 guinea pigs were used and all showed typical spotted fever. At the first adult feeding 9 guinea pigs were used and 6 showed typical spotted fever. At the second adult feeding 18 females were tested individually, resulting in transmission by 7. These females survived to infect guinea pigs 249, 373, 429, 533, 809, and 994 days, respectively, following the infective feeding in the second nymphal stage. One female that failed to infect a guinea pig at 2 successive feedings produced eggs which proved infective when injected. Males effected transmission up to 414 days by feeding and conserved the organisms in their tissues for 1,119 days, as shown by the injection of 3 engorged ticks. Following the injection of these 3 males there were 2 days of normal temperature, 8 days of fever with scrotal involvement, and subsequent immunity.

Data on transmission by the F1 to F4 generation of ticks (experiment 2) are presented briefly in table 1 and representative thermic curves are shown in figures 1 to 3. In the successive developmental stages of each group of ticks tested there was an increase in the number of ticks shown to be infective, e. g., in the F3 generation, using 256 ticks, there were no infections following the first three test feedings. At the fourth, all 9 host guinea pigs became infected and 8 showed scrotal swelling. At the fifth, all 25 host guinea pigs became infected. Eighteen reacted with scrotal swelling, 2 died, and the remaining 23 were immune.

Ten additional transmission experiments (Nos. 3 to 12) were performed using, respectively, 48, 27, 13, 59, 20, 15, 10, 10, 21, and 21 ticks for the infective feedings. In two of these experiments it was

TABLE 1.—*Spotted fever of the United States: transmission by* Ornithodoros parkeri

[Experiment 2, F1 to F4 generations]

Generation	Number of ticks used	Guinea pigs infected		Remarks
		Larval feeding	At nymphal and adult feedings	
F1	84	None	40 of 70	At fifth test feeding all 11 guinea pig hosts became infected.
F2	127	None	26 of 79	At fifth test feeding 14 of the 20 guinea pig hosts became infected.
F3	256, series 1 124, series 2	None None	34 of 48 11 of 19	At fifth test feeding all of the 25 guinea pig hosts became infected.
F4	129	None	18 of 34	At fourth test feeding 11 of 13 guinea pig hosts became infected. Last test feeding 1,333 days following the infective feeding of the F4 generation in the second nymphal stage.

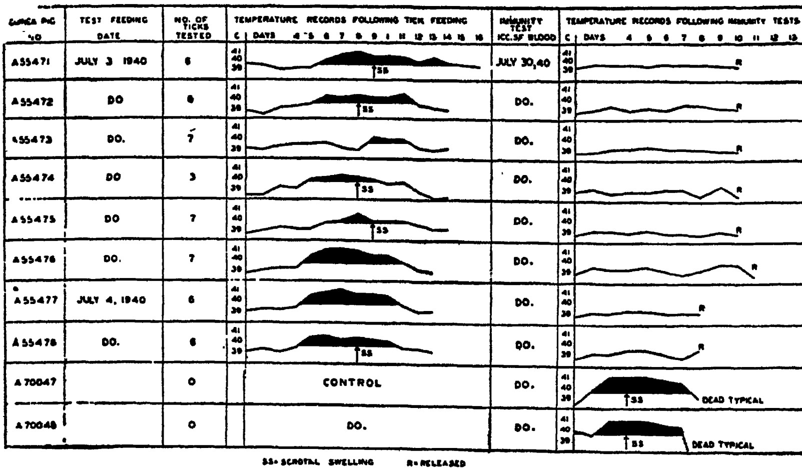

FIGURE 1.—Rocky Mountain spotted fever: experimental transmission by *Ornithodoros parkeri*, F1 generation, fifth test feeding.

shown that the ticks had not acquired the infective organisms. With the remaining groups transmission was effected throughout the several nymphal stages and as adults.

In the F1 generation 9,277 larvae, representing 8 of these experiments, were tested, and in the F2 generation 9,755 larvae representing 2 experiments. All surviving ticks were given at least 3 nymphal test feedings. Transmission through the egg was demonstrated in the F1 generation in 5 of the 8 experiments and in the F2 generation in the

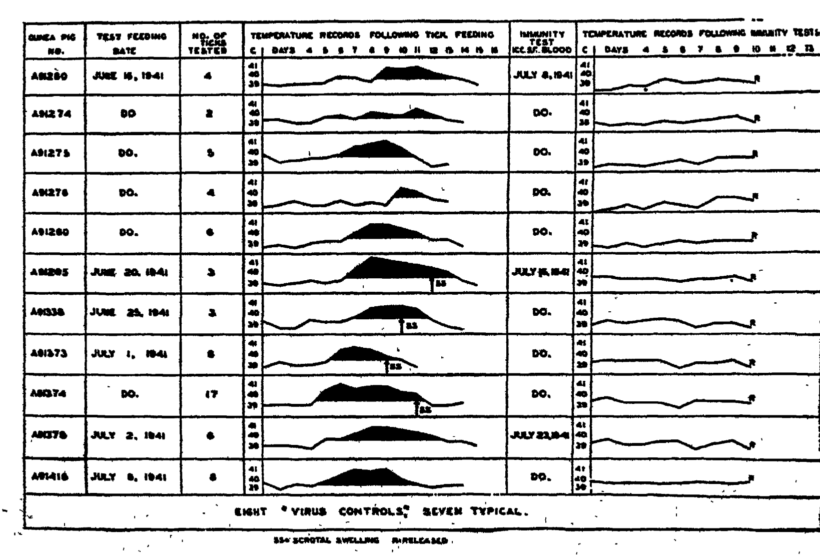

FIGURE 2.—Rocky Mountain spotted fever: experimental transmission by *Ornithodoros parkeri*, F2 generation, fifth test feeding.

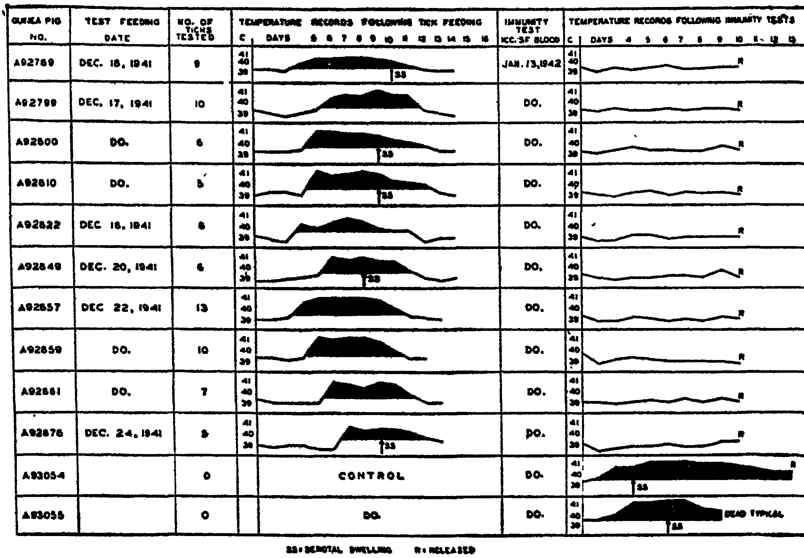

FIGURE 3.—Rocky Mountain spotted fever: experimental transmission by *Ornithodoros parkeri*, F3 generation, fifth test feeding.

2 experiments. As representative of the progressive number of infections in successive test feedings, the results obtained following 2 ovipositions in the F1 and F2 generations were as follows:

EXPERIMENT 7

F1 generation: Ticks were tested in 2 series following the first and second oviposition.

Series 1.—908 larvae, 4 guinea pigs, one transmission; 732 first nymphs, 11 guinea pigs, no infections; 662 second nymphs, 10 guinea pigs, 2 transmissions; 619 third nymphs, 16 guinea pigs, 3 transmissions. At the fifth test feeding there were 25 guinea pigs with 5 transmissions.

Series 2.—1,197 larvae were used. One guinea pig on which 451 larvae engorged died on the seventeenth day following 7 days of fever, with scrotal reaction. At the second test feeding none of the 13 guinea pigs showed evidence of infection. At the third test 2 of 14 became infected and at the fourth test 23 of 27. In this group 9 showed scrotal swelling, 5 died, and the remaining 18 were immune.

F2 generation: 6,734 and 2,621 ticks were tested in 2 series following the first and second oviposition. All ticks were given 3 test feedings and a small group in series 1, 4. In series 1 the larvae failed in transmission. At the first nymphal feeding 16 guinea pigs were used and 6 became infected; at the second nymphal feeding 31 were used and 19 became infected; at the fourth test feeding 122 ticks and 9 guinea pigs were used and all hosts became infected. In series 2,

3 guinea pigs were used for the larval feeding. One on which 1,395 larvae engorged showed 7 days of fever with scrotal edema, terminating in death on the thirteenth day. The spleen and scrotal lesions were typical. Two guinea pigs remained afebrile. At the first nymphal feeding 19 guinea pigs were used, 15 of which showed febrile periods and 2 extensive scrotal sloughing. Four died and the remainder were immune. At the second nymphal feeding 50 guinea pigs were used with 24 transmissions. Five died and the remainder were immune.

COLOMBIAN SPOTTED FEVER

Ten experiments are reported with 4 to the F1 and 2 to the F2 generations.

One female sent to Colombia and given an infective feeding by Dr. Patiño-Camargo was given 3 test feedings over a period of 3 months with negative results. Progeny of this female, 71, 215, 332, and 99 ticks (first to fourth oviposition) given 4 test feedings resulted in infection with ticks of the second and fourth ovipositions but none from those of the first and third.

In the remaining 9 experiments 20, 20, 35, 32, 10, 11, 18, 25, and 15 ticks, respectively, were used for the infective feedings. Four successive test feedings of the first 2 groups failed to produce an infection. Ticks in experiments 4 to 10, tested in subgroups, produced typical infection throughout the nymphal and adult stages. Experiment 5 is presented in detail.

EXPERIMENT 5

On January 29, 1941, 32 first nymphs were given an infective feeding and subsequently 3 test feedings over a period of 9 months. The first infection occurred at the first test feeding terminating in death. At the second feeding all 4 host guinea pigs became infected, 3 died, and one was immune to spotted fever. At the third test 3 of 4 guinea pigs showed febrile periods of 4, 6, and 10 days, respectively, and were immune to spotted fever.

F1 generation: Eleven of the above ticks, as females, were tested individually and held for oviposition. Two failed in transmission and died without progeny. One was infective and died without progeny. Four failed in transmission and their progeny were noninfective. Progeny of these 4 were tested as follows: ♀3, 2 series, 118 and 176 ticks, respectively; ♀4, 2 series, 122 and 138 ticks; ♀5, 3 series, 63, 94, and 110 ticks; and ♀11, 2 series, 108 and 25 ticks. All ticks were given from 3 to 4 test feedings.

Female 2 was infective. Following the first oviposition 103 ticks were given 4 test feedings with negative results. In a second series 239 larvae failed in transmission. At the first nymphal feeding 1 of 2

guinea pigs became infected; at the second nymphal feeding 1 of 3, and at the fourth test all 5 hosts died. Four showed scrotal swelling and 1 extensive scrotal sloughing.

Two failed in transmission but gave rise to infective progeny.

Female 8 failed in transmission; 20 progeny also failed through 3 test feedings, but at the fourth caused 8 days of fever and the test guinea pig was subsequently immune.

Female 9 also failed in transmission at 3 successive feedings but gave rise to 3 series of infective progeny. In series one, 57 ticks were used and 50 of these were given 4 additional test feedings. Twenty-five guinea pigs were used in the second to fifth feedings, 11 of which showed febrile periods, and 6 scrotal swelling, 1 died, the remainder were immune. In series 2, 109 ticks were used. The first infection was following the third test feeding. Ten guinea pigs were used in the third to fifth feedings. Nine of these showed febrile periods, 4 scrotal swelling, and 1 extensive scrotal sloughing. Two died; the remainder were immune. In series 3, 86 ticks were used. Again the first infection occurred following the third test feeding. Four guinea pigs were used for the third and fourth test feedings. Three showed scrotal swelling, 2 died, and 2 were immune.

F2 generation: 244 larvae failed to produce an infection. At the second test feeding 1 of 3 guinea pigs died showing typical lesions and following the third test feeding 7 of 8 hosts became infected. Four showed scrotal swelling, 5 died, and 2 were immune.

Transmission through the ovum: In addition to the data on transmission through the egg in experiments 1 and 5, in experiment 9, 624, 95, and 561 ticks (first to third ovipositions) in the F1 generation were tested, resulting in infections at the *larval* and all subsequent feedings. In experiment 10, 683 F1 generation ticks were tested with an increasing number of infections at successive tests feedings. Following the fifth test, 27 of 42 guinea pigs showed febrile periods and 24 scrotal swelling. Eight died; the remainder were immune.

In the F2 generation the larvae from females in each of 10 vials were tested separately. The numbers varied from 31 to 756. All ticks were given 3 test feedings. The progeny of ticks from 6 of the 10 vials were infective.

BRAZILIAN SPOTTED FEVER

Four experiments are reported with two to the F1 generation.

Twenty-six, 17, 24, and 41 ticks, respectively, were used in the infective feedings. The lot of 24 was subsequently shown not to have acquired the infecting organism. All other groups produced typical infections at successive feedings.

Transmission through the ovum.—In experiment 1, 1,825 larvae from successive ovipositions failed to infect the several guinea pig hosts.

At the first nymphal feeding 1 of 19 guinea pigs became infected, at the second 6 of 36, and at the third 26 of 51. Nineteen of the total number of infected guinea pigs showed marked scrotal swelling and 2 that died showed extensive scrotal sloughing. In experiment 2, 1,521 larvae from 2 ovipositions were tested, resulting in infection at the *larval* and subsequent feedings. As in experiment 1, an increasing number of animals became infected at successive feedings.

INFECTIVITY OF FASTING TICKS

Ticks from United States, Colombian, and Brazilian spotted fever groups, shown to be infective, were allowed to fast for 1 year and retested on the anniversary of the last feeding. The prefebrile periods in the guinea pig hosts were not shortened nor were the infections of less severity. Progeny of these fasting ticks produced severe infections with marked scrotal reactions and death of the host.

DISCUSSION

The argasid tick *Ornithodoros parkeri* is present in nine of the Western States in which spotted fever is also present but is unknown in Colombia and Brazil. It has been collected in local areas in Wyoming, Colorado, Montana, and Oregon, in large numbers in Washington (*5*), and is widely distributed in Utah (*2*) and Nevada. Recently a heavy infestation was encountered in southern Idaho (*3*). In California, this tick appears along the San Joaquin Valley from Butte County toward the north to Kern County in the south (*4*).

Ornithodoros parkeri has numerous hosts in common with *Dermacentor andersoni*, a common vector to man.

Because of the multiple nymphal stages and longevity of *O. parkeri*, there are frequent feedings and consequently frequent potential transmissions.

In the above experiments transmission was effected by larvae, throughout the nymphal stages, by males and females, and through the egg to the fourth generation. One female was infective 994 days following the infective feeding in the second nymphal stage. The interval between the infective feeding in experiment 2 and the fourth test feeding in the F4 generation was 1,333 days. The invasiveness of the infective agent did not weaken over this period. The incubation periods in the last test feeding were 3 days in each of 3 guinea pigs, 4 in 4, and 5 in 4. The shortest febrile period was 5 days and the longest 8. There was scrotal edema in 7 of the 12 guinea pigs.

Transmission of the specific agents of the spotted fevers of Colombia and Brazil was obtained as regularly as for the spotted fever of the United States. The biologic relationship of these 3 immunologically identical infective agents to *Ornithodoros parkeri* may be considered as further evidence of their identity.

SUMMARY

The argasid tick *Ornithodoros parkeri* transmits the infectious agents of spotted fevers of the United States, Colombia, and Brazil with equal facility.

Transmission was effected by larvae, throughout the nymphal stages, and by the male and female.

Females that fail in transmission may give rise to infective progeny.

Transmission through the egg was observed in spotted fever of the United States to the F4 generation, in the spotted fever of Colombia to the F2 generation, and in the spotted fever of Brazil to the F1 generation.

The invasiveness of the infecting agent was not lessened by continuous tick passage.

Ticks that had fasted for 1 year produced typical infection and progeny of these fasting ticks produced infections resulting in the death of the host.

The data submitted suggest that this tick may be a factor in the maintenance of spotted fever in nature and, occasionally at least, a vector to man.

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A NOTE ON THE RICKETTSIOSES IN INDIA

By NORMAN H. TOPPING, *Passed Assistant Surgeon, United States Public Health Service*, R. HEILIG, *First Physician, Krishnarajendra Hospital, and Professor of Medicine, Medical College, University of Mysore*, and V. R. NAIDU, *Professor of Pathology, Medical College, University of Mysore*

Megaw (*1*) in 1921 described a case of a typhus-like illness in India in which the tick was implicated as the vector. Since that time there have been many cases of typhus-like illness described throughout India. The vector of most of these cases could not be accurately determined and, since the cases were largely sporadic, epidemiological

investigations have not been particularly enlightening in this regard. Weil-Felix studies on some of these cases, using the three standard proteus antigens OX19, OX2, and OXK, have revealed no great uniformity in results.

The rickettsioses in India, therefore, are not clearly differentiated. Apparently there is endemic (murine) typhus for Webster (*2*) isolated strains from wild rats that produced proteus OX19 agglutinins. Thompson (*3*) reported a small outbreak, probably of epidemic (louse-borne) typhus, which consisted in seven cases with four deaths. Webster (*2*) also isolated in animals a strain of rickettsial virus from a patient who gave a high OXK agglutination. This leads one to suspect that cases of the mite-borne type, such as Malayan typhus (scrub typhus) or tsutsugamushi fever, may exist in India. Finally, there apparently are cases that cannot be classified readily by either the Weil-Felix test or by clinical or epidemiological considerations.

Two of us (R. H. and V. R. N.) have recently published studies on typhus fever in Mysore (*4* and *5*); the cases reported fall into the indeterminate group rather than into one of the more clearly defined groups. The clinical aspects of the disease suggest certain similarities to Rocky Mountain spotted fever in the United States. The location and other characteristics of the rash are quite similar to the Rocky Mountain spotted fever eruption; the duration of the fever is also similar. The Weil-Felix reactions in the cases were not consistent and in no reported instance were the results with OX19 comparable to the high titres seen consistently in cases of endemic typhus fever in the United States or of epidemic typhus fever elsewhere.

Bengtson has reported a technique for the preparation of rickettsial antigens to be used in complement-fixation tests (*6*) and has demonstrated the specificity of such tests (*7* and *8*). For some time the complement-fixation test has been employed at the National Institute of Health as a means of differentiating Rocky Mountain spotted fever from typhus. The test has been of decided advantage over the agglutination reaction in differentiating these ailments since both of these diseases produce a positive Weil-Felix. Neutralization tests may be employed but are more difficult to perform and require large numbers of animals, while cross protection tests entail the isolation of the causative agent which frequently is impossible.

To study further the cases of typhus occurring in India, serums from three of the most recent cases seen by R. H. and V. R. N. were shipped to the National Institute of Health for test by the complement-fixa-

tion method. The technique employed was that described by Bengtson (*6*). The following results were obtained:

Serum dilutions

	1:4	1:8	1:16	1:32	1:64	1:128	1:256	1:512
CASE 1								
Rocky Mt. spotted fever antigen	4+	4+	4+	4+	2+	1+	trace	0
Epidemic typhus antigen	1+	trace	0	0	0	0	0	0
Endemic typhus antigen	2+	1±	0	0	0	0	0	0
CASE 2								
Rocky Mt. spotted fever antigen	4+	4+	4+	4+	4+	4+	4+	2+
Epidemic typhus antigen	1+	trace	0	0	0	0	0	0
Endemic typhus antigen	4+	4±	4±	3+	2+	1+	1±	0
CASE 3								
Rocky Mt. spotted fever antigen	4+	4+	4+	4+	4+	4+	4+	1±
Epidemic typhus antigen	4+	4±	1+	0	0	0	0	0
Endemic typhus antigen	4+	4±	4±	1+	1±	0	0	0

These results indicate that the causative agent of these three cases is more closely related immunologically to the rickettsia of Rocky Mountain spotted fever than to the rickettsia of either endemic or epidemic typhus. We have no explanation for the cross-fixation at lower titres with endemic typhus antigens. We have, however, occasionally seen serums from cases of Rocky Mountain spotted fever and endemic typhus that gave cross-fixation with the other antigen, but this is not common.

From our results it would seem that there are cases of a rickettsial disease in India that produce in the patient's serum high titre complement-fixing antibodies against the rickettsial antigen of Rocky Mountain spotted fever. The exact determination of the identity of this disease will depend upon the isolation and identification of the etiological agent in laboratory animals.

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AN APPROACH TO THE MENTAL HYGIENE-PUBLIC HEALTH PROBLEM

By Gerhard B. Haugen, M. D., *Director, Division of Mental Hygiene, Oregon State Board of Health*

During the past few years many suggestions have been made for establishing mental hygiene activities in relation to public health, and a number of such programs have been started. This paper reports a new approach to the mental hygiene-public health problem.

A Division of Mental Hygiene was established under the Oregon State Board of Health in 1941 as a joint project with the University of Oregon Medical School. The entry of the United States into the war has hampered the progress of this venture, but sufficient experience has been gained to indicate a future line of endeavor which probably will be fruitful.

A common procedure, when first establishing a division of mental hygiene, is to center activities around a child guidance clinical program. The University of Oregon Medical School had already been conducting child guidance clinics in from 10 to 12 centers over the State. Since it seemed inadvisable to duplicate this work, arrangements were made to continue them as a cooperative venture.

Experience gained in conducting these clinics had made clear several things important for future development of the mental hygiene program. First, an attempt to deal with all children with behavior problems by means of such clinics, in a State with such a large area and small population as Oregon, would be very costly. Second, many of the problems which arose could have been dealt with much more easily if they had been recognized in their incipiency. Third, it was very difficult to interest physicians in such a program, and their lack of interest, or occasional antagonism, hampered progress. Fourth, this activity gave little aid in dealing with the problems of the adult.

Consideration of the first two points mentioned led to the belief that the emphasis in conducting the child guidance clinics should be on education rather than therapy. That is, each child should be considered as primarily a teaching case, from which every effort would be made to teach parents, public health nurses, teachers, physicians, and any other interested parties. It was felt that these persons would then be better able to recognize problems early and to deal more intelligently with them. Teaching was accomplished by special conferences with interested individuals and by presentation of cases before groups such as teachers' meetings. The results were promising, in that the case load has dropped in several communities with the explanation, "We know how to deal with some of these cases which we didn't understand before, so it is unnecessary to send

as many children to the clinic." To augment this program, courses dealing with child guidance were given to public health nurses in training. After the war an attempt will be made to establish required courses in the State colleges of education with demonstration clinics in connection with the training schools of these institutions.

Regarding the skeptical or indifferent attitude of physicians toward the child guidance program, it was felt that one should not be critical of the general practitioner's concept of this activity. Few of them had received more than a fragmentary training in psychiatry in medical school, and they were unable to visualize clearly the connection between child guidance service and the patients whom they saw in their private practices. Furthermore, few of them were dealing satisfactorily with their neurotic patients; many freely confessed that they had little interest in the field.

The University of Oregon Medical School had been developing a therapeutic approach to the handling of neurotic adults which appeared to be suitable for the general practitioner. Many recent graduates from the school and a number of internists who had come in contact with the work were successfully using a simple psychiatric approach. It was therefore suggested that one could "kill two birds with one stone" by the postgraduate education of physicians in psychiatry, which would enable them to deal more satisfactorily with their neurotic patients and which would also give them an understanding of the potential value of child guidance.

The onset of the war caused a marked redistribution of population in Oregon. This, combined with the withdrawal of physicians into the armed forces, made it difficult to find a community where physicians still had time for postgraduate work. In one city of about 20,000 population, it was found that the situation was still "normal" enough that this training plan for physicians could be demonstrated.

Even under normal circumstances it is difficult to induce physicians to take postgraduate work at some center away from their homes. It was therefore decided to bring the course to the physicians. As a preliminary step, the approval of the president of the State Medical Society was obtained for a postgraduate course in psychiatry to be sponsored jointly by the State Board of Health and the University of Oregon Medical School. Next, the approval of the president of the county medical society was obtained. Arrangements were then made to meet with the local medical society, where the problem of dealing with the neurotic patient was discussed, and the course to be offered locally, if sufficient physicians desired it, was outlined.

After the group evidenced interest, arrangements were made to meet with the physicians one evening a week for lecture and discussion. Since lectures alone are insufficient, arrangements were made to see patients with each physician at his office. In this way the doctor had

an opportunity to observe diagnostic procedures, demonstrations of interview work, etc., to augment what he had heard in the lectures and discussions.

The Director of Mental Hygiene spent 2 days a week for about 3 months in this demonstration community. Twelve physicians participated in the program, and eight received sufficient aid to enable them to diagnose and deal satisfactorily with minor mental hygiene problems, particularly the common anxiety-tension states.

It was found that the physician in general practice has unusual opportunities to deal with these conditions in their early stages. In several cases the patients had been suffering acutely for periods of only 1 to 4 weeks. Dealing with the problem in such an early stage often made it relatively easy to help a patient to understand his illness, whereas if he had continued over a long period with inadequate treatment, it would probably have developed into a much more difficult condition.

The physicians themselves became enthusiastic after they had improved their understanding of some of these patients and watched them improve under treatment. Several stated that their appreciation of psychosomatic relationships in the practice of medicine had been greatly improved. Toward the last of the course a number of the physicians asked for material on child guidance, for they had begun to see the connection between the patients with whom they were dealing and childhood problems.

A casual survey among physicians in Oregon indicates that in normal times about 20 percent of them would take advantage of postgraduate courses of this type. It also appears probable that, if the demonstration community were revisited after a time, there would be an additional number who would feel that they had missed something and would desire to participate. If, after such preparation, one proposed establishment of a child guidance clinic or other clinical mental hygiene service for a community, one could reasonably expect the help and support of members of the medical profession for the project.

The type of psychiatric approach which is offered to physicians will undoubtedly make considerable difference in the success of such a venture. Certainly one cannot expect to make full-fledged psychiatrists of them, nor do they wish this. The material presented must be of such a nature that they can easily see its immediate value to them in their practices. After they have obtained some usable concepts and experienced some success in applying them, more detailed and complicated material can be presented. The technique developed at the University of Oregon Medical School has proved to be valuable because of its stress on normal physiology, the absence of complicated vocabulary, and the fact that the presence of a third party in the interview does not seem to jeopardize the physician-patient relationship.

When it is possible, after the war, to resume this program actively, it is planned to carry on the course simultaneously in three or more adjacent communities. It is anticipated that within two years most of the physicians outside of Portland can be reached in this way. There are no psychiatrists in the State outside of Portland, except at the two State hospitals for the insane.

Whether or not traveling clinics for adults will be established subsequent to the training program for physicians will depend largely upon the apparent need at the time. It would seem that completion of this program would largely obviate the need for such clinics; on the other hand, the education of physicians would greatly augment the usefulness of clinics if they were established. At present, many physicians are clumsy at referring neurotic patients and often do so in a way which tends to scare the patient away from a psychiatrist. Certainly, physicians who have an understanding of the problem will not only be able to treat some simple cases but can prepare others for the psychiatrist in a way that will make his work easier and more effective.

FELLOWSHIPS IN HEALTH EDUCATION FOR 1943

Through a training grant made available by the W. K. Kellogg Foundation, the Public Health Service has 17 trainees in health education attending the School of Public Health of the University of North Carolina. For the school year beginning the fall of 1943, the W. K. Kellogg Foundation has made available to the Public Health Service another grant for the establishment of 16 more such fellowships leading to a master's degree in public health with a major in health education.

The experience of those organizations in which health education has been effective has demonstrated that the health educator must have a complete mastery of education and must also be professionally trained in community health education. In the past, scientific training of this nature has been limited. The present shortage of such highly trained personnel, as well as a contemplated demand growing out of future expansion of health education activities, both in this country and in foreign lands, is the chief concern of the sponsors of the fellowships. For this reason, the stipends of $100 per month plus tuition not only provide for a year's training (9 months of intramural work and 3 months of supervised field experience) but also anticipate trainee employment following successful completion of the basic training. Due to the increasing demand for manpower for military service, men will not be considered for fellowships. Arrangements have been completed for the training to be given at the University of North Carolina, Yale University, and the University of Michigan.

A candidate for the position of health educator should have not only sound scientific training but good personal health and a pleasing appearance. There is great need for the health educator to have creative ability, leadership qualities, sound judgment, common sense, and adaptability. Since the success of the person in this field depends upon these qualifications, the awarding of fellowships will be made accordingly.

In view of the fact that the field of community public health education is new, standardized and specific training as a qualification for the fellowships could not fairly be requested. However, it is considered pertinent and important that the candidate be able to present a background which includes some or all of the following fields of knowledge and skill:

1. Basic cultural education, including the development of appreciations and skills in the use of the English language.
2. Basic science education, including physics, chemistry, biology, physiology, and bacteriology.
3. Training in education and educational psychology.
4. Social science education to provide an appreciation of the importance of respect for human personality and government.

Fellowships are open to women between the ages of 19 and 40, inclusive, who are American citizens. Women who are interested and qualified may obtain application blanks from the Surgeon General, United States Public Health Service, Washington (Bethesda Station) 14, D. C. Final application forms must be in the office of the Surgeon General not later than September 4, 1943.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

June 20–July 17, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended July 17, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

DISEASES ABOVE MEDIAN PREVALENCE

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 1,582 during the preceding 4 weeks to 1,111 during the 4 weeks ended July 17. For the country as a whole the

incidence was the highest on record for this period. The number of cases was almost 4 times the number reported for the corresponding period in 1942 and more than 7 times the 1938–42 median. The nearest approach to the current figure was in 1929, when 610 cases were reported for the corresponding 4 weeks.

Meningococcus meningitis cases reported by weeks during 1943 with comparative data for the corresponding period in 1942, 1941, and 1929 [1]

Division	1943, week ended—												
	May 1	May 8	May 15	May 22	May 29	June 5	June 12	June 19	June 26	July 3	July 10	July 17	July 24
All regions: [2]													
1943	592	604	481	544	427	444	384	327	335	245	267	264	237
1942	80	89	86	81	81	68	75	64	112	52	61	63	45
1941	33	53	33	49	38	34	31	48	37	28	38	26	27
1929	283	298	309	235	258	229	197	199	151	137	123	131	98
New England:													
1943	64	62	52	50	37	37	40	50	39	26	33	30	25
1942	13	14	10	11	10	9	7	3	16	4	11	10	5
1941	2	7	0	3	2	4	5	4	5	0	2	0	2
1929	5	7	7	8	5	4	2	7	9	5	3	6	6
Middle Atlantic:													
1943	159	156	146	169	157	135	113	86	82	81	55	62	59
1942	25	23	21	28	18	38	26	21	26	14	17	17	12
1941	9	9	6	18	9	7	7	7	8	6	14	6	6
1929	52	38	56	46	54	39	42	30	16	30	37	30	30
East North Central:													
1943	96	74	63	80	53	57	70	57	69	33	33	41	42
1942	3	4	2	3	1	1	5	4	3	2	4	2	2
1941	5	7	6	9	2	4	6	5	1	2	4	3	4
1929	105	145	132	97	121	127	105	93	79	51	40	55	26
West North Central:													
1943	39	26	38	23	19	32	27	17	23	13	16	24	14
1942	2	3	3	3	6	3	4	4	1	4	3	8	2
1941	2	2	2	5	2	0	0	1	0	2	3	1	1
1929	31	27	32	21	29	22	18	20	16	15	9	6	7
South Atlantic:													
1943	103	111	75	87	70	92	48	47	40	43	64	47	32
1942	17	22	18	17	17	7	15	17	23	8	11	9	13
1941	9	12	6	10	5	5	5	21	11	11	4	6	6
1929	7	14	15	8	3	6	6	5	2	6	6	4	1
East South Central:													
1943	38	61	46	60	24	15	15	13	18	5	10	15	14
1942	10	6	4	5	6	5	7	4	5	3	5	8	4
1941	5	8	10	1	6	2	3	2	4	2	6	5	4
1929	4	1	6	3	5	2	3	6	2	4	2	4	0
West South Central:													
1943	26	24	21	19	13	14	11	20	17	11	13	15	14
1942	6	12	13	3	8	2	4	6	4	7	6	4	1
1941	0	4	2	2	9	6	2	2	2	2	4	3	1
1929	11	10	6	9	6	5	3	7	9	3	5	3	5
Mountain: [2]													
1943	16	13	14	10	17	21	24	6	14	11	8	5	3
1942	0	0	4	0	4	0	0	1	1	1	2	3	1
1941	0	1	0	0	1	0	0	0	2	1	1	1	1
1929	32	25	27	21	13	7	6	11	9	7	14	7	5
Pacific:													
1943	51	77	26	46	37	41	36	31	33	22	35	25	34
1942	4	5	11	11	11	3	7	4	33	9	2	2	3
1941	1	3	1	1	2	6	3	6	4	2	0	0	2
1929	36	31	28	22	22	17	12	20	9	16	7	16	18

[1] Similar tables appeared in Public Health Reports for Mar. 19, 1943, p. 494, Apr. 16, 1943, p. 648, May 14, 1943, p. 777, and June 11, 1943, p. 919.
[2] Exclusive of Nevada.

The table shows, by geographic areas, the number of cases reported in recent weeks of 1943, the number for the corresponding period in 1942 and 1941, and also that in the peak year 1929. While each region of the country showed a decline from the preceding 4-week period, the numbers of cases in each region were considerably above the 1938–42 median. In the New England region the number of cases (128) was more than 25 times the median; in the Pacific region the number (115) was more than 14 times the median; and in the East North Central region the number (176) was almost 12 times the median. In other regions the excesses ranged from 3.4 times the median in the East South Central region to 9.5 times the median in the Mountain region.

While the disease has been most prevalent in regions along the Atlantic coast, each section of the country has contributed to the high incidence that has prevailed since the latter part of 1942. Since the lowest level of this disease is normally reached during the summer months, it is quite probable that the number of cases will continue on a relatively high level throughout the remainder of the year. Since the beginning of the current year, there have been 12,542 cases reported, as compared with a median of 1,255 cases for the corresponding period in 1938–42. For this period in 1929 there were approximately 7,000 cases reported.

Influenza.—While the incidence of influenza dropped considerably during the current 4-week period, the number of cases was more than 60 percent above the 1938–42 median for this period. More than 75 percent of the total cases were reported from six States, viz, Texas (1,098), South Carolina (451), Virginia (162), Arizona (159), and California (145 cases); in other places the incidence was about normal for this season of the year.

Measles.—For the current period there were 38,549 cases of this disease reported, as compared with a preceding 5-year median of approximately 24,000 cases. The disease was most prevalent in the North Atlantic and North Central regions, the numbers of cases in each region being about twice the median incidence for the region. There was a slight excess in the number of cases in the Pacific region, but in the South Atlantic, South Central, and Mountain regions the incidence was slightly below the estimated expectancy.

Whooping cough.—For the country as a whole the number of cases (16,276) of whooping cough was slightly above the 1938–42 median incidence for the corresponding period. In the North Atlantic and East North Central regions the incidence was relatively low, but all other regions reported excesses over the 1938–42 median.

Diphtheria.—During the 4 weeks ended July 17, there were 624 cases of diphtheria reported, as compared with 558 for the corresponding period in 1942 and a 1938–42 median of 637 cases. The Pacific region reported an excess of more than 40 percent over the median, but in other regions the incidence either closely approximated the median or fell considerably below it.

Poliomyelitis.—The number of cases (297) of poliomyelitis reported during the current period was about 25 percent above the incidence during the same weeks in 1942, but it was slightly below the 1938–42 median. The increase was largely due to a sharp rise in the number of cases in Oklahoma (39), Texas (102), and California (90). No other region or State reported more than the normal increase that might be expected at this season of the year.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period June 20–July 17, 1943, the number for the corresponding period in 1942, and the median number of cases reported for the corresponding period 1938–1942

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	624	558	637	2,616	1,690	1,599	38,549	23,046	23,946
New England	13	24	17	5	1	7	4,320	3,160	3,929
Middle Atlantic	102	75	103	23	22	22	12,572	4,581	6,666
East North Central	100	99	117	102	135	135	12,634	4,007	5,810
West North Central	38	34	57	53	26	42	2,496	1,263	1,263
South Atlantic	75	88	119	770	537	546	1,717	1,193	1,741
East South Central	45	56	56	65	70	82	503	186	547
West South Central	111	102	102	1,178	493	493	850	644	1,035
Mountain	30	31	66	264	297	130	1,071	1,898	1,129
Pacific	110	49	77	156	109	109	2,386	6,114	1,942
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	1,111	288	150	297	237	301	4,446	3,866	5,053
New England	128	41	5	6	8	5	862	507	507
Middle Atlantic	280	74	34	14	13	18	849	984	1,506
East North Central	176	11	15	4	35	33	1,059	1,106	1,612
West North Central	76	16	11	15	17	17	284	321	366
South Atlantic	194	51	35	6	22	27	265	279	275
East South Central	48	21	14	5	60	41	108	162	162
West South Central	56	21	10	148	56	31	154	108	124
Mountain	38	7	4	9	13	9	363	109	132
Pacific	115	46	8	90	13	31	502	290	356
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	26	51	158	618	789	857	16,276	13,933	15,178
New England	0	0	0	27	24	21	606	1,483	990
Middle Atlantic	0	0	0	56	74	74	2,841	3,628	3,628
East North Central	5	15	36	98	67	100	3,710	3,757	3,757
West North Central	10	11	71	20	40	56	1,160	665	725
South Atlantic	0	1	3	138	196	196	3,120	1,391	2,298
East South Central	6	12	11	99	133	133	721	528	581
West South Central	0	6	21	149	204	256	2,035	965	1,453
Mountain	1	5	10	12	33	33	769	525	625
Pacific	4	1	11	19	18	42	1,314	991	1,276

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.

Scarlet fever.—For the current 4-week period there were 4,446 cases of scarlet fever reported, as compared with 3,866, 5,053, and 5,703 cases for the corresponding period in 1942, 1941, and 1940, respectively. The New England, West South Central, Mountain, and Pacific regions reported more cases than normally occur during this period, but in other regions the incidence was relatively low.

Smallpox.—The incidence of smallpox was the lowest on record for this period. The number of cases (26) was considerably below even the preceding year when only 51 cases were reported for this period. The 1938–42 median was 158 cases and the average number during the corresponding weeks in the years 1933–42 approximated 350 cases.

Typhoid and paratyphoid fever.—The number of cases of these diseases was also relatively low, 618 as compared with 784 in 1942, and a median of 857 cases for the corresponding period in 1938–42. With one exception, the New England region, the incidence was comparatively low in all sections of the country. The most significant decline was, however, reported from the West South Central region, 149 cases being reported from that region, as compared with a 5-year median of 256 cases.

MORTALITY, ALL CAUSES

For the 4 weeks ended July 17, there were approximately 34,000 deaths from all causes reported to the Bureau of the Census for the group of large cities. The number was almost 10 percent more than the average number reported for the corresponding period in the 3 preceding years. So much internal migration has taken place since 1940 that no accurate population estimates have been made, so it is uncertain as to how much of the current increase is due to increased population and how much represents an increased death rate.

The monthly death rate from all causes among persons insured in the industrial department of the Metropolitan Life Insurance Co. has been above the corresponding month of the preceding year for every month from October 1942 to May 1943, the last available data. The average of the excesses in the rates for these 8 months over rates for the corresponding month of the preceding year was 8.8 percent.

INCIDENCE OF HOSPITALIZATION, JUNE 1943

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	1942	1943
1. Number of plans supplying data	65	68
2. Number of persons eligible for hospital care	8,659,649	10,784,904
3. Number of persons admitted for hospital care	86,363	103,880
4. Incidence per 1,000 persons, annual rate, during current month (daily rate ×365)	121.2	117.2
5. Incidence per 1,000 persons, annual rate for the 12 months ended June 30	107.2	106.1

DEATHS DURING WEEK ENDED JULY 24, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 24, 1943	Corresponding week, 1942
Data from 88 large cities of the United States:		
Total deaths	7,532	7,780
Average for 3 prior years	7,568	
Total deaths, first 29 weeks of year	253,067	229,645
Deaths under 1 year of age	573	580
Average for 3 prior years	542	
Deaths under 1 year of age, first 29 weeks of year	18,005	15,267
Data from industrial insurance companies:		
Policies in force	65,649,886	64,952,205
Number of death claims	11,736	10,766
Death claims per 1,000 policies in force, annual rate	9.3	8.6
Death claims per 1,000 policies, first 29 weeks of year, annual rate	10.2	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 31, 1943

Summary

A total of 361 cases of poliomyelitis was reported for the current week, as compared with 329 for the preceding week and a 5-year (1938–42) median of 146. The current excess incidence of the disease continues to be confined to a few States, 75 percent, 269 cases, of the total number being reported in 4 States, as follows (last week's figures in parentheses): Texas, 105 (96); California, 104 (111); Oklahoma, 30 (42); and Kansas, 30 (7). No other State reported more than 11 cases. The cumulative total for the first 30 weeks of the year is 2,316, more than for the corresponding period of any other year since 1934, when 3,180 cases, only 44 percent of the year's total, had been reported, although the peak of weekly incidence had been reached with a report of 376 cases in the third week of June. The peak of the 1938–42 weekly medians, 501 cases, occurred during the 3rd week of September.

A further reduction in the incidence of meningococcus meningitis was recorded for the week, although the total of 203 cases reported, as compared with 237 for the preceding week and a median of 31, is nearly three and one-half times the average for the corresponding weeks of the past 15 years. The cumulative total for the first 30 weeks of the year is 12,981, as compared with 7,720 in 1929, the largest number recorded for the corresponding period of any prior year.

Of the 7 other common communicable diseases included in the table, and for which prior comparable data are available, the incidence of only influenza increased as compared with the preceding week, and the totals of only influenza, measles, and whooping cough were above the corresponding median figures.

Deaths recorded for the week in 90 large cities of the United States totaled 8,305, as compared with 8,217 for the preceding week and a 3-year (1940–42) average of 8,289. The accumulated number for the first 30 weeks of the year is 284,120, as compared with 258,770 for the same period of last year.

Telegraphic morbidity reports from State health officers for the week ended July 31, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42
	July 31, 1943	Aug. 1, 1942		July 31, 1943	Aug. 1, 1942		July 31, 1943	Aug. 1, 1942		July 31, 1943	Aug. 1, 1942	
NEW ENGLAND												
Maine	1	0	0	------	------	------	11	20	23	3	3	0
New Hampshire	0	0	0	------	------	------	4	18	3	1	0	0
Vermont	0	0	0	------	------	------	20	47	32	2	0	0
Massachusetts	0	4	2	------	------	------	191	164	164	10	2	2
Rhode Island	0	1	0	------	------	------	79	42	27	1	0	0
Connecticut	0	1	1	------	1	1	44	51	46	0	3	0
MIDDLE ATLANTIC												
New York	3	11	10	----	[1] 4	[1] 4	438	211	355	36	10	5
New Jersey	1	3	6	2	2	2	345	53	56	5	4	0
Pennsylvania	7	7	8	2	------	------	57	74	83	16	2	2
EAST NORTH CENTRAL												
Ohio	3	1	4	4	8	2	210	43	43	11	1	0
Indiana	1	4	4	3	------	3	30	4	8	3	1	0
Illinois	8	8	17	7	5	6	168	33	36	14	2	1
Michigan [2]	6	1	1	1	------	------	354	31	133	7	1	1
Wisconsin	5	7	1	7	8	8	323	196	253	1	0	0
WEST NORTH CENTRAL												
Minnesota	4	2	0	2	1	1	77	24	19	1	0	0
Iowa	0	0	1	------	------	------	17	18	28	3	0	0
Missouri	2	0	2	------	------	------	29	5	8	10	0	1
North Dakota	1	0	3	------	1	------	79	4	4	1	0	0
South Dakota	0	1	1	------	------	------	21	2	2	0	0	0
Nebraska	3	1	1	1	2	------	7	31	8	0	0	0
Kansas	2	1	1	------	------	2	29	10	15	2	1	1
SOUTH ATLANTIC												
Delaware	1	0	0	------	------	------	1	0	2	2	0	0
Maryland	0	0	1	2	2	2	43	27	12	7	3	0
District of Columbia	1	0	2	1	------	------	20	2	3	4	0	0
Virginia	3	3	4	86	45	27	39	9	57	5	2	1
West Virginia	3	6	4	2	------	5	5	2	7	4	2	2
North Carolina	6	4	8	------	------	------	22	13	21	8	1	0
South Carolina	5	4	3	131	63	69	15	12	9	3	0	1
Georgia	5	11	11	8	2	7	7	6	6	2	0	0
Florida	2	3	3	5	3	2	12	11	11	5	0	0
EAST SOUTH CENTRAL												
Kentucky	0	5	5	------	------	------	2	10	15	1	2	1
Tennessee	2	2	2	1	11	11	1	5	16	3	0	0
Alabama	3	3	5	39	23	3	19	2	32	2	0	8
Mississippi [2]	3	3	3	------	------	------	------	------	------	3	0	0
WEST SOUTH CENTRAL												
Arkansas	0	5	3	2	15	15	3	17	17	3	0	0
Louisiana	5	3	4	7	3	3	1	4	3	3	1	0
Oklahoma	6	2	2	6	4	7	5	2	13	0	0	0
Texas	15	27	24	187	83	83	52	36	37	3	2	1
MOUNTAIN												
Montana	2	0	0	------	2	------	49	18	16	1	0	0
Idaho	0	0	0	------	------	------	5	12	4	0	0	0
Wyoming	2	1	1	10	11	1	10	14	5	0	0	0
Colorado	4	2	10	15	20	5	17	16	16	0	0	0
New Mexico	1	2	2	2	------	------	3	9	9	0	1	0
Arizona	1	0	0	34	17	17	24	25	26	0	0	0
Utah [2]	0	0	0	1	------	------	19	101	31	5	0	0
Nevada	0	0	------	------	------	------	3	4	------	2	1	------
PACIFIC												
Washington	3	1	1	------	------	------	41	84	16	0	3	0
Oregon	0	0	0	4	9	8	49	49	33	1	0	0
California	8	10	16	24	24	12	201	292	275	9	6	2
Total	128	150	179	596	369	369	3,201	1,863	2,342	203	54	31
30 weeks	6,743	6,915	8,371	80,073	79,691	150,757	531,495	463,284	463,284	12,982	2,242	1,330

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 31, 1943 and comparison with corresponding week of 1942 and 5-year median—Continued

Division and State	Poliomyelitis: Week ended July 31, 1943	Poliomyelitis: Week ended Aug. 1, 1942	Poliomyelitis: Median 1938–42	Scarlet fever: Week ended July 31, 1943	Scarlet fever: Week ended Aug. 1, 1942	Scarlet fever: Median 1938–42	Smallpox: Week ended July 31, 1943	Smallpox: Week ended Aug. 1, 1942	Smallpox: Median 1938–42	Typhoid and paratyphoid fever [3]: Week ended July 31, 1943	Typhoid and paratyphoid fever [3]: Week ended Aug 1, 1942	Typhoid and paratyphoid fever [3]: Median 1938–42
NEW ENGLAND												
Maine	0	8	0	7	9	4	0	0	0	1	1	2
New Hampshire	0	0	0	0	0	1	0	0	0	0	0	1
Vermont	2	0	0	0	1	1	0	0	0	1	1	1
Massachusetts	1	0	2	78	48	48	0	0	0	5	1	1
Rhode Island	1	0	0	1	1	1	0	0	0	0	0	0
Connecticut	7	1	1	16	10	9	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York	10	7	7	73	66	70	0	0	0	7	10	10
New Jersey	3	10	3	13	15	23	0	0	0	3	5	5
Pennsylvania	0	5	4	36	55	55	0	0	0	7	6	9
EAST NORTH CENTRAL												
Ohio	5	5	5	50	51	51	0	0	1	24	16	7
Indiana	2	2	2	11	6	15	0	0	0	8	0	4
Illinois	6	12	4	27	41	64	0	1	1	7	13	15
Michigan [2]	8	4	7	23	35	53	0	0	0	5	5	5
Wisconsin	0	1	0	26	31	33	0	2	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	2	1	1	20	18	18	0	0	4	0	0	0
Iowa	0	2	2	8	11	13	1	0	3	0	6	4
Missouri	8	2	1	8	3	13	0	0	0	3	4	11
North Dakota	0	0	0	3	3	2	0	2	1	0	0	0
South Dakota	0	0	0	2	6	6	0	0	1	0	0	0
Nebraska	0	2	2	3	1	1	0	0	0	0	0	0
Kansas	30	0	1	14	23	23	0	0	0	1	3	3
SOUTH ATLANTIC												
Delaware	0	0	0	1	2	2	0	0	0	0	0	0
Maryland	1	0	0	9	9	9	0	0	0	3	6	5
District of Columbia	0	0	0	3	6	3	0	0	0	1	0	0
Virginia	3	3	3	16	10	11	0	0	0	10	10	10
West Virginia	1	3	1	13	10	10	0	0	0	3	5	10
North Carolina	1	3	3	20	14	14	0	0	0	13	7	7
South Carolina	0	2	2	0	3	3	0	0	0	10	1	12
Georgia	1	4	4	11	14	7	0	0	0	16	18	38
Florida	0	1	1	4	3	3	0	0	0	3	4	3
EAST SOUTH CENTRAL												
Kentucky	11	16	4	16	16	11	0	0	0	15	23	23
Tennessee	0	15	2	2	11	12	0	1	1	7	11	17
Alabama	2	6	6	8	13	11	0	0	0	17	5	9
Mississippi [2]	1	4	1	3	6	4	0	0	0	4	12	11
WEST SOUTH CENTRAL												
Arkansas	6	10	2	1	5	5	0	0	0	8	11	30
Louisiana	0	3	3	0	3	4	0	0	0	6	13	23
Oklahoma	30	4	3	6	5	6	0	0	0	4	9	20
Texas	105	5	5	20	14	14	0	0	0	27	29	43
MOUNTAIN												
Montana	0	0	0	4	2	5	1	0	0	2	0	0
Idaho	0	0	0	3	1	2	0	0	0	0	2	1
Wyoming	0	0	0	10	2	2	0	0	0	0	0	0
Colorado	0	1	0	15	12	12	0	0	1	5	0	3
New Mexico	1	2	1	0	3	3	0	0	0	4	3	4
Arizona	0	0	0	5	1	1	0	0	1	3	3	3
Utah [2]	3	0	1	4	1	4	0	0	0	0	0	2
Nevada	0	0	-----	1	0	-----	0	0	-----	0	1	-----
PACIFIC												
Washington	2	0	0	6	4	9	0	0	0	0	0	1
Oregon	4	0	0	6	1	4	0	0	0	2	1	4
California	104	2	9	71	34	45	0	0	0	2	1	8
Total	361	146	146	677	639	746	2	6	21	237	246	385
30 weeks	2,316	1,021	1,206	95,462	87,281	114,282	598	602	1,893	2,661	3,362	3,829

See footnotes at end of table.

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Telegraphic morbidity reports from State health officers for the week ended July 31, 1943 and comparison with corresponding week of 1942 and 5-year median—Continued

Division and State	Whooping cough			Week ended July 31, 1943								
	Week ended		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	July 31, 1943	Aug. 1, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	18	54	31	0	0	0	0	0	0	0	0	0
New Hampshire	2	0	0	0	0	0	0	0	0	0	0	0
Vermont	23	64	31	0	0	0	0	0	0	0	0	0
Massachusetts	92	217	126	0	0	1	0	0	0	0	0	0
Rhode Island	32	6	6	0	0	0	0	0	0	0	0	0
Connecticut	25	95	63	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	260	442	420	0	2	34	0	0	0	0	0	2
New Jersey	169	257	254	0	0	0	0	0	0	2	0	0
Pennsylvania	254	293	322	0	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	267	227	313	0	0	2	0	0	0	1	0	0
Indiana	48	56	27	0	0	0	0	0	0	0	0	0
Illinois	179	408	389	0	0	0	0	1	0	1	1	0
Michigan [3]	293	262	262	0	0	2	0	0	0	0	0	0
Wisconsin	313	291	212	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	76	53	46	0	1	0	0	0	0	0	0	0
Iowa	45	83	25	0	1	0	0	0	0	2	0	0
Missouri	46	16	22	0	0	0	0	0	0	0	0	0
North Dakota	57	5	17	0	0	0	0	2	0	0	1	0
South Dakota	5	1	5	0	0	0	0	1	0	0	0	0
Nebraska	28	6	16	0	0	0	0	0	0	0	0	0
Kansas	92	66	66	0	0	0	1	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	2	3	0	0	0	0	0	0	1	0	0
Maryland	100	46	55	0	0	0	2	0	0	2	0	0
Dist. of Col.	24	12	12	0	0	0	0	0	0	0	0	0
Virginia	124	68	68	0	0	0	383	0	0	4	0	1
West Virginia	52	16	16	0	0	0	0	0	0	0	0	1
North Carolina	117	77	172	0	0	24	0	0	0	2	0	1
South Carolina	127	18	31	0	0	35	0	0	0	0	0	5
Georgia	16	25	25	0	2	19	2	0	0	0	1	42
Florida	19	22	9	0	7	0	0	0	0	0	0	11
EAST SOUTH CENTRAL												
Kentucky	28	76	72	0	0	0	3	0	0	0	2	0
Tennessee	32	40	65	0	0	0	2	0	0	5	0	1
Alabama	64	17	26	0	0	0	0	0	0	0	0	6
Mississippi [2]				0	0	0	0	0	0	0	1	1
WEST SOUTH CENTRAL												
Arkansas	27	16	17	0	1	27	0	0	0	0	2	0
Louisiana	5	6	6	0	0	3	0	0	0	0	0	13
Oklahoma	16	2	17	0	0	0	0	0	0	0	0	0
Texas	245	90	126	0	53	391	0	2	0	0	1	45
MOUNTAIN												
Montana	34	24	11	0	0	0	0	0	0	1	1	0
Idaho	0	6	8	0	0	0	0	0	0	0	0	0
Wyoming	0	8	8	0	0	0	0	0	0	0	1	0
Colorado	28	29	43	0	0	4	0	0	0	0	0	0
New Mexico	7	9	19	0	0	1	5	0	0	0	0	0
Arizona	10	10	10	0	1	0	29	0	0	0	0	0
Utah [2]	85	37	71	0	0	0	0	0	0	0	3	0
Nevada	3	0		0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	53	22	36	0	0	0	0	0	0	0	0	0
Oregon	36	10	15	0	0	0	0	0	0	0	0	0
California	231	144	228	0	3	15	0	11	0	0	0	1
Total	3,807	3,693	3,759	0	71	558	427	18	0	21	14	180
30 weeks	121,874	112,867	117,164	37	1,225	8,686	3,516	354	17	279	544	1,768
30 weeks, 1942				54	625	4,669	3,320	266	32	305	591	1,391

[1] New York City only. [2] Period ended earlier than Saturday.

[3] Including paratyphoid fever cases reported separately as follows: Maine, 1; Massachusetts, 4; New York, 1; Illinois, 1; Michigan, 2; South Carolina, 1; Georgia, 2; Tennessee, 2; Texas, 1; Colorado, 2; California, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 17, 1943

This table lists the reports from 85 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	1	0	------	0	33	2	0	0	1	0	0	2
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	1	41	5	9	0	28	0	1	12
Fall River	2	0	------	0	9	0	0	0	0	0	0	1
Springfield	0	0	------	0	14	1	2	0	3	0	0	2
Worcester	0	0	------	0	5	2	8	0	4	0	0	3
Rhode Island:												
Providence	0	0	------	0	56	0	0	1	5	0	1	19
Connecticut:												
Bridgeport	0	0	1	1	2	1	1	0	2	0	0	2
Hartford	0	0	------	0	1	0	0	0	2	0	0	2
New Haven	0	0	------	0	8	1	0	2	1	0	0	5
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	2	3	2	0	4	0	0	8
New York	6	0	4	1	399	19	40	8	33	0	3	90
Rochester	0	0	------	0	14	2	4	0	2	0	0	16
Syracuse	0	0	------	0	19	1	5	0	0	0	0	25
New Jersey:												
Camden	0	0	------	0	0	0	0	0	0	0	0	1
Newark	0	0	------	0	65	3	1	0	3	0	0	34
Trenton	0	0	------	0	0	0	2	0	0	0	0	1
Pennsylvania:												
Philadelphia	1	0	------	0	95	5	6	0	13	0	0	109
Pittsburgh	3	0	1	1	0	1	9	0	7	0	1	37
Reading	0	0	------	0	0	0	1	0	1	0	0	2
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	8	2	0	0	1	0	1	8
Cleveland	5	0	2	1	6	5	10	1	18	0	1	76
Columbus	0	0	------	0	18	0	0	0	2	0	0	1
Indiana:												
Fort Wayne	0	0	------	0	0	0	0	0	0	0	0	2
Indianapolis	0	0	------	0	13	1	9	0	5	0	0	20
South Bend	0	0	------	0	6	0	0	1	2	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	7	0	1	0	139	8	7	3	24	0	1	80
Springfield	0	0	------	0	0	0	2	0	1	0	0	0
Michigan:												
Detroit	1	0	------	0	187	6	9	0	8	0	0	51
Flint	0	0	------	0	2	0	0	0	0	0	0	6
Grand Rapids	0	0	------	0	49	0	0	0	1	0	0	5
Wisconsin:												
Kenosha	0	0	------	0	1	0	0	0	1	0	0	4
Milwaukee	0	0	------	0	89	1	2	0	11	0	0	49
Racine	0	0	------	0	2	0	0	0	2	0	0	3
Superior	0	0	------	0	19	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	118	0	3	0	4	0	0	12
Minneapolis	0	0	------	0	3	1	3	2	9	0	0	2
St. Paul	0	0	------	0	23	0	5	0	0	0	0	31
Missouri:												
Kansas City	0	1	------	0	9	1	6	1	2	0	0	13
St. Joseph	0	0	------	0	0	0	0	0	0	0	0	1
St. Louis	0	0	------	0	16	4	11	0	2	0	0	31
North Dakota:												
Fargo	0	0	------	0	6	1	3	0	0	0	0	1
Nebraska:												
Omaha	0	0	------	0	0	0	0	0	0	0	0	5
Kansas:												
Topeka	0	0	------	0	7	1	0	0	0	0	0	12
Wichita	0	0	------	0	0	1	1	1	0	0	0	11

See footnotes at end of table.

City reports for week ended July 17, 1943

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0		0	5	1	2	0	0	0	0	0
Maryland:												
Baltimore	0	0		0	35	5	5	0	7	0	0	77
Cumberland	0	0		0	0	0	0	0	0	0	0	0
Frederick	0	0		0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	2	0		0	33	2	9	0	4	0	2	32
Virginia:												
Lynchburg	0	0		0	8	0	0	0	1	0	0	12
Richmond	0	0		0	24	2	1	1	0	0	0	14
Roanoke	0	0		0	1	0	0	0	0	0	0	3
West Virginia:												
Wheeling	0	0		0	0	0	1	0	0	0	0	16
North Carolina:												
Winston-Salem	0	0		0	2	0	1	0	0	0	0	21
South Carolina:												
Charleston	0	0	2	0	1	1	0	0	1	0	0	1
Georgia:												
Atlanta	0	0	3	0	3	0	2	0	3	0	0	4
Brunswick	0	0		0	0	0	1	0	0	0	0	0
Savannah	0	0	1	1	1	0	0	0	0	0	0	0
Florida:												
Tampa	0	0		0	0	0	0	0	0	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0		1	4	0	3	0	2	0	1	14
Nashville	0	0		0	1	0	2	0	0	0	0	7
Alabama:												
Birmingham	0	0		0	5	1	1	0	4	0	1	1
Mobile	1	0		0	0	0	2	1	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0		0	1	0	1	0	0	0	0	5
Louisiana:												
New Orleans	0	0	3	1	3	1	10	0	0	0	2	4
Shreveport	0	0		0	0	0	3	2	0	0	0	0
Texas:												
Dallas	0	0		0	1	0	1	10	0	0	0	4
Galveston	0	0		0	0	0	0	1	1	0	0	0
Houston	1	0		0	2	2	2	4	1	0	1	13
San Antonio	1	0		0	0	0	3	0	2	0	0	7
MOUNTAIN												
Montana:												
Billings	0	0		0	2	0	2	0	0	0	1	0
Great Falls	0	0		0	5	0	0	0	0	0	0	1
Missoula	0	0		0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0		0	5	0	3	0	2	0	1	18
Pueblo	0	0		0	2	0	0	0	0	0	0	8
Utah:												
Salt Lake City	0	0		0	5	1	0	0	3	0	0	47
PACIFIC												
Washington:												
Seattle	1	0		0	41	3	1	0	0	0	0	13
Spokane	0	0		0	5	0	1	0	5	0	0	3
Tacoma	0	0		0	0	1	0	0	0	0	0	4
California:												
Los Angeles	4	0	9	0	49	3	7	11	7	0	0	29
Sacramento	0	0		0	0	0	4	5	0	0	0	4
San Francisco	1	0	2	1	21	0	6	4	7	0	0	12
Total	40	1	29	9	1,749	101	235	59	252	0	19	1,169
Corresponding week, 1942	31	4	41	12	1,029	19	270	13	318	0	33	1,266
Average, 1938-42	59		27	[1] 9	[2] 1,202		[1] 232		338	3	36	1,316

[1] 3-year average, 1940-42. [2] 5-year median.

Anthrax.—Cases: Philadelphia, 2.

Dysentery, amebic.—Cases: Boston, 1; Kansas City, 1; Los Angeles, 2.

Dysentery, bacillary.—Cases: New York, 1; Detroit, 2; Baltimore, 3; Charleston, S. C., 10; Atlanta, 8; Nashville, 6; Los Angeles, 5.

Dysentery, unspecified.—Cases: Richmond, 2; San Antonio, 9; Sacramento, 1.

Typhus fever.—Cases: Pittsburgh, 1; Brunswick, 4; Savannah, 2; Tampa, 1; Mobile, 1; Dallas, 1; Houston, 2; San Antonio, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 85 cities in the preceding table (estimated population, 1942, 34,576,700)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza: Case rates	Influenza: Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
NEW ENGLAND	9.9	0	2.5	5.0	420	29.8	49.7	7.5	114.3	0	5.0	119
MIDDLE ATLANTIC	4.5	0	2.2	.9	265	15.2	31.2	3.6	28.1	0	1.8	144
EAST NORTH CENTRAL	7.6	0	1.8	.6	315	13.4	22.8	2.9	44.4	0	1.8	178
WEST NORTH CENTRAL	0.0	2.0	0	0	356	17.6	62.5	7.8	33.2	0	0	233
SOUTH ATLANTIC	5.3	0	10.6	1.8	200	19.5	39.0	1.8	28.4	0	5.3	319
EAST SOUTH CENTRAL	5.9	0	0	5.9	59	5.9	47.5	5.9	35.6	0	11.9	131
WEST SOUTH CENTRAL	5.9	0	8.8	2.9	21	8.8	58.7	49.9	11.7	0	8.8	97
MOUNTAIN	8.5	0	0	0	162	8.5	42.7	0.0	42.7	0	17.1	632
PACIFIC	10.5	0	19.2	1.7	203	12.2	33.2	35.0	33.2	0	0	114
Total	6.0	.2	4.4	1.4	264	15.2	35.4	8.9	38.0	0	2.9	176

TERRITORIES AND POSSESSIONS

Panama Canal Zone

Notifiable diseases—May 1943.—During the month of May 1943, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	10		3		7		1		21	
Diphtheria	7	2	3				4		[1] 14	2
Dysentery (amebic)	2		2		1		3		8	
Dysentery (bacillary)					1	1	1		2	1
Leprosy			1					1	1	1
Malaria [2]	17		11		247		91	1	366	1
Measles	1				15		1		17	
Meningitis, meningococcus	1		1						2	
Mumps	70		4		36		4		114	
Paratyphoid fever							11		11	
Pneumonia		16		5	30			1	[3] 30	22
Tuberculosis		25		14	4	2		12	[3] 4	53
Typhoid fever							2	1	2	1
Whooping cough		1								1

[1] Exclusive of carriers. [2] 90 recurrent cases. [3] In the Canal Zone only.

Virgin Islands of the United States

Notifiable diseases—April–June 1943.—During the months of April, May, and June 1943, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	April	May	June	Disease	April	May	June
Chickenpox	1			Pellagra	1		
Filariasis	2	2	6	Schistosomiasis	3	1	
Gonorrhea	31	21	10	Syphilis	31	19	24
Hookworm disease	2	3	3	Tuberculosis			1
Malaria		1		Typhus fever			1
Mumps	1	2	3	Whooping cough	25	51	37

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 3, 1943.—During the week ended July 3, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox	2	23	1	57	236	21	55	24	100	519
Diphtheria	1	9	1	10		2			2	25
Dysentery (bacillary)				2						2
Encephalitis, infectious					1					1
German measles		32		9	69	5	17	19	38	189
Influenza					17	2	1		93	113
Measles	3	24	1	103	1,198	93	57	279	198	1,956
Meningitis, meningococcus				1	1				3	5
Mumps		42		12	220	49	17	68	68	476
Scarlet fever	11	10	2	48	78	29	65	33	20	296
Tuberculosis (all forms)	5	1	4	103	72	5		24	15	229
Typhoid and paratyphoid fever				14	1		1	1		17
Undulant fever				4	3					7
Whooping cough			1	130	190	19	9	19	47	415

CUBA

Habana—Communicable diseases—4 weeks ended June 26, 1943.—During the 4 weeks ended June 26, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	30	3	Scarlet fever	1	
Leprosy	1		Tuberculosis	3	1
Malaria	6		Typhoid fever	45	3
Measles	24				

Provinces—Notifiable diseases—4 weeks ended June 19, 1943.—During the 4 weeks ended June 19, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	1	3	16	3	9	34
Chickenpox						3	[illegible]
Diphtheria		36	1	1	1		[illegible]
Dysentery	10						[illegible]
Hookworm disease		49				1	[illegible]
Leprosy		4	1				[illegible]
Malaria	31	3	7	18	8	596	[illegible]
Measles		32	5	2	1		[illegible]
Poliomyelitis	1	1			2		[illegible]
Rabies				1			[illegible]
Scarlet fever		1					[illegible]
Tuberculosis	30	29	26	53	16	47	[illegible]
Typhoid fever	11	67	14	78	19	25	[illegible]
Whooping cough				5			[illegible]

[1] Includes the city of Habana.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

India—Madras Presidency.—According to information dated June 29, 1943, it is reported that cholera is present in epidemic form in certain coastal sections of the Malabar coast, Madras Presidency, India. The epidemic is of the virulent form in several wards of Calicut, and has spread to nearby districts. Up to June 26, 1943, there were 918 cases with 624 deaths reported in South Malabar.

Plague

Indochina—Cochinchina.—During the period June 11–20, 1943, 3 cases of plague were reported in Cochinchina, Indochina.

Senegal.—For the period June 20–30, 1943, 29 cases of plague with 24 deaths were reported in Louga District and 30 cases of plague with 28 deaths were reported in Thies District, Senegal. For the period June 30–July 4, 1943, 6 cases of plague were reported in Dakar District.

Smallpox

Belgian Congo.—For the week ended April 10, 1943, 460 cases of smallpox were reported in Belgian Congo.

Indochina.—For the period June 11–20, 1943, 79 cases of smallpox were reported in Indochina as follows: Annam, 12 cases; Cambodia, 24 cases; Cochinchina, 39 cases; Tonkin, 4 cases.

Turkey.—During the month of May 1943, 650 cases of smallpox were reported in Turkey.

Typhus Fever

Algeria.—For the period June 11–20, 1943, 164 cases of typhus fever were reported in Algeria.

Hungary.—For the week ended July 10, 1943, 7 cases of typhus fever were reported in Hungary.

Rumania.—For the week ended July 17, 1943, 116 cases of typhus fever were reported in Rumania.

Slovakia.—For the week ended June 26, 1943, 32 cases of typhus fever were reported in Slovakia.

Turkey.—For the month of May 1943, 935 cases of typhus fever were reported in Turkey, including 295 cases in Istanbul.

Yellow Fever

Colombia—Cundinamarca Department.—Yellow fever has been reported in Cundinamarca Department, Colombia, as follows: June 6, 1943, 1 death; June 16, 1943, 1 death.

COURT DECISIONS ON PUBLIC HEALTH

Safe drinking water at State institution—liability of State officials for failure to furnish.—(United States Circuit Court of Appeals, 7th Circuit; *People of State of Illinois, for use of Trust Co. of Chicago et al.* v. *Maryland Casualty Co. et al., Maryland Casualty Co. et al.* v. *Bowen et al.*, 132 F.2d 850; decided December 9, 1942.) Actions were brought against the sureties to recover upon the official bonds of certain officers of the State of Illinois for the death of and injuries to certain persons from typhoid fever alleged to have resulted from contaminated water at an Illinois mental hospital. The deceased and injured persons were not inmates of the hospital but were employed at construction work on the premises. The State officers concerned were the director and assistant director of the department of public welfare, the director of the department of public health, and the managing officer of the particular State hospital involved. Neither the said officers nor the departments were sued but the defendant-sureties as third party plaintiffs filed their petitions against such officers as third party defendants, seeking to hold the officers personally liable if their official bonds had been breached. The officers moved to dismiss both the original complaint and the third party complaint, and the trial court entered an order dismissing both complaints. On appeal to the United States Circuit Court of Appeals the question was presented whether such officers were liable for their alleged negligent, wanton, and willful failure to furnish safe drinking water at the hospital.

It was the contention of the plaintiffs that it was the officers' duty "to cause safe water to be furnished" at the hospital and that this duty stemmed from the statutes of Illinois creating the departments of public health and public welfare and providing for the powers and duties of the departments and their officers. No specific duty to furnish safe drinking water at the hospital was provided by statute. According to the appellate court the State, when it by statute defined the powers and described the duties of the said officers, was not creating duties which the officers owed to the individuals who might constitute the general public of the State; it was merely outlining the State's assumed public duty. In such a situation, said the court, the law seemed to be clear that "if the duty discharged is a public duty and not a duty which the individuals owe to any particular person, then for their negligence or wanton or willful omission in the performance of this public duty, the officers are not liable, except to the State." Since the officers were discharging a public duty and not a duty which they owed the individuals in the instant case, the court held that there could be no liability on the part of the officers to such parties. Furthermore, since the officers were not liable to the plain-

tiffs for their conduct, it was also held that there could be no action by the plaintiffs upon the officers' official bonds.

Death certificates—statements as to cause of death.—(Pennsylvania Superior Court; *Stauffer* v. *Hubley Mfg. Co. et al.*, 30 A.2d 370; decided January 28, 1943.) In a workmen's occupational disease compensation case the Superior Court of Pennsylvania referred to a statute which prescribed that a certificate of death should contain, among other things, the following information: "Cause of death, including the primary and immediate causes, and contributory causes or complications, if any, and duration of each." After pointing out that a distinction was made between primary and immediate causes on the one hand and contributory causes or complications on the other, the court proceeded to define the terms by stating (*a*) that primary cause meant the main, chief, principal, or predominate cause of death—not some serious disease which would probably have caused death in the future but was not the principal cause of death at the time—and (*b*) that immediate cause meant the direct, present, instant, or proximate cause of death—that which produced the result without any intervening agency. In many cases, perhaps in the majority, continued the court, the primary cause and the immediate cause are the same, and in such event any other cause or disease which contributed to or accelerated the death was a secondary, contributing or complicating cause. "Where the primary cause and the immediate cause are not the same, in order to be the primary cause of the death, it must have produced or brought about the immediate cause which resulted in the death." The court illustrated its definitions by the following examples: (1) If a diabetic man was severely crushed about his chest in an accident and traumatic pneumonia set in resulting in his death from pneumonia, the immediate cause of death was the traumatic pneumonia, the primary cause was the crushing of the chest which produced or brought about the pneumonia, and diabetes may have been a contributory, secondary, or complicating cause; (2) if a man suffered an accident which merely lowered his vitality and in his weakened condition he fell a victim to a germ disease which was not produced or brought about by the accident, the primary and immediate cause of death was the germ disease and the accident was a "passive ally" or at the most only a contributory, secondary, or accelerating cause.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 **AUGUST 13, 1943** NUMBER 33

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Public Health Reports

Vol. 58 • AUGUST 13, 1943 • *No. 33*

JAUNDICE FOLLOWING ADMINISTRATION OF HUMAN SERUM [1]

By JOHN W. OLIPHANT, *Surgeon*, ALEXANDER G. GILLIAM, *Senior Surgeon*, and CARL L. LARSON, *Passed Assistant Surgeon, United States Public Health Service*

Jaundice following the inoculation of materials containing homologous serum is by no means a new condition. During recent years certain outbreaks have served to focus attention on the condition. Its relation to other diseases in which jaundice is a major symptom has not been established with clarity and its etiology has not been definitely proved. It is the purpose of this paper to present evidence regarding the nature of the agent responsible for this disease.

Hirsch (*1*) records an outbreak of aundice among individuals vaccinated with "humanized lymph in glycerine." Among 1,289 persons vaccinated, 191, or 14.8 percent, developed jaundice after incubation periods "extended to several weeks and even to a couple of months." No cases developed among 500 persons vaccinated with a different lymph.

In 1918 Theiler (*2*) reported a condition known as "staggers" in horses, which followed administration of homologous serum. Jaundice was a marked sign. The incubation period varied from 27 to 165 days and the mortality varied from 4 to 18 percent among large groups of immunized horses. Slagsvold (*3*) found that 101, or 4.2 percent, of 2,400 horses treated with anthrax serum developed liver damage from 8 to 95 days following injection of the serum. In most cases the elapsed period was 50 to 60 days. A similar condition in horses following the administration of equine encephalomyelitis vaccine containing homologous serum has been observed in this country (*4*, *5*).

MacNalty (*6*) drew attention to the occurrence of jaundice among 37 of 82 to 109 persons who had been given convalescent measles serum from the same pool of material Seven deaths were recorded. Convalescent measles serum in doses of 4.5 cc. was given to seven children

[1] From the Division of Infectious Diseases, National Institute of Health.

and in 78 to 83 days these children developed severe jaundice. Three cases terminated fatally. Two months later two children who had been in contact with the previous cases developed mild infective hepatitis (*7*).

Findlay and MacCallum (*8*) found that hepatitis was a complicating factor in the use of yellow fever vaccines. Different types of vaccines used produced jaundice; the only common factors in the products were human serum and the attenuated virus of yellow fever. During a 5-year period 3,100 persons were immunized against yellow fever and 89, or 2.87 percent, of these developed jaundice. The average incubation period was 2 to 3 months with a range of 36 days to 7 months. Hepatitis has been associated with the use of yellow fever vaccine by other workers. Soper and Smith (*9*) described the first series of cases occurring in South America. A vaccine containing immune monkey serum and tissue culture virus was used. Among 244 persons immunized, 66, or 27 percent, developed hepatitis. The incubation period was prolonged.

Fox and his coworkers (*10*) have studied two outbreaks of hepatitis following the use of yellow fever vaccine in Brazil. In 1939, 304 persons were immunized and 27 percent suffered from hepatitis during the fourth and fifth months following immunization. In 1940, 35 lots of vaccine were used to vaccinate 107,169 persons. There were only 93 cases, or 0.1 percent, of jaundice among 87,878 persons given material from 33 lots of vaccine. Two other lots produced a greater amount of jaundice among the recipients. The attack rate with one lot used in 9,604 individuals was 7.68 percent and for another used in 9,587 persons the rate was 1.56 percent. The average incubation period was 24.8 weeks for the 33 lots of vaccine, 17.8 weeks for the lot producing the highest attack rate of icterus, and 20.4 weeks for the other lot. A total of 25 deaths was recorded.

Recent Army experience with yellow fever vaccine resulted in 28,585 cases of hepatitis with 62 deaths as of July 24, 1942 (*11*).

Immunization against pappataci fever has also resulted in the appearance of jaundice after a prolonged period. The method used for immunization consisted of separate inoculations of virus and antiserum. Virus was obtained from human blood during the acute stage of the disease. Sergiev et al. (*12*) studied 109 cases of jaundice resulting from the use of such materials. The incubation period varied from 63 to 146 days; about 50 percent of the cases occurred between 85 and 95 days after inoculation. About 30 percent of those vaccinated subsequently developed hepatitis.

A recent communication (*13*) attributes 48 cases of jaundice with 8 deaths to the use of pooled convalescent and adult human serum for measles. Incubation periods ranged from 16 to 161 days. A total of 12 cases of jaundice due to transfusion were also recorded. A number

of other cases of hepatitis developed following the use of mumps convalescent serum. The writers conclude that, "Any doubt as to the reality of the association is removed by the frequency with which hepatitis has followed the injection of human blood products."

Findlay and Martin (*14*) present evidence that an "infective icterogenic agent" is present in the nasopharynx of individuals developing hepatitis following yellow fever immunization. While some doubt might be maintained concerning two of the cases produced by this experimental approach, the evidence concerning the third case is convincing. Voegt (*15*) attempted to transmit the agent of infective hepatitis from one person to another with results which are suggestive, if not conclusive.

Some confusion exists regarding the relation of jaundice following administration of homologous serum and the disease known as infectious hepatitis, epidemic catarrhal jaundice, or infectious jaundice. It would appear from the work of Cullinan (*16*), Pickles (*17*), and others that infectious jaundice is spread by droplet infection and has an incubation period varying from 20 to 40 days. On the other hand, few secondary cases have been attributed to association with cases of jaundice following the administration of homologous serum and in this disease the incubation period is prolonged considerably over that of infectious jaundice. A recent editorial (*18*) expresses the problem admirably.

Many attempts have been made to isolate the etiological agent of infective jaundice and of jaundice following the administration of homologous serum in animals with negative results Although no significant data have been accumulated it has been assumed that the causal agent is a virus.

The opportunity to study hepatitis following the use of yellow fever vaccine presented itself when an outbreak occurred in the Virgin Islands in the summer of 1942. Sufficient epidemiological evidence was accumulated to establish the identity of the disease and material was obtained for study of the causative agent. Human volunteers were available for experimental work. The results of such studies form the basis of this report and furnish some evidence concerning the nature of the responsible agent.

EPIDEMIOLOGY

During 1942 a total of 11,358 individuals on the islands of St. Thomas and St. John, Virgin Islands, was inoculated with lot 331 yellow fever vaccine containing pooled human serum. According to reliable data there are 11,265 persons living on the island of St. Thomas and 765 on the island of St. John, but due to wartime increases in population these figures may be too low. There were 11,147 persons vac-

cinated with yellow fever vaccine on St. Thomas between March 4 and March 28, 1942, and 211 persons vaccinated on St. John on April 17, 1942. The same lot of vaccine was used throughout the immunization procedure. The dates of vaccination together with the numbers of persons vaccinated are given in table 1.

TABLE 1.—*Dates of immunization and numbers of persons vaccinated with yellow fever vaccine in the Virgin Islands*

Date immunized, 1942	Place	Number immunized	Date immunized, 1942	Place	Number immunized
Mar. 4	St. Thomas	490	Mar. 16	St Thomas	1,554
Mar. 5	do	403	Mar. 18	do	1,505
Mar. 6	do	624	Mar. 20	do	2,568
Mar. 9	do	1,134	Mar. 23	do	298
Mar. 10	do	392	Mar. 28	do	410
Mar. 11	do	596	Apr. 17	St. John	211
Mar. 12	do	597			
Mar. 13	do	576	Total		11,358

Jaundice was first noted in May, and by June 2, 1942, about 50 cases had been observed. During the next two weeks it was estimated that between 300 and 500 cases occurred. In order to obtain some exact knowledge concerning the incidence of the disease following the administration of vaccine, a survey was done in the city of Charlotte Amalie, St. Thomas, between July 6 and July 16. A group of 1,198 persons was studied. This sample is roughly 10 percent of the population involved. The data obtained from this survey are included in table 2. It was established that 14.7 percent of the vaccinated individuals developed symptoms of hepatitis following vaccination and that the incidence was greatest in the age groups between 20 and 59 years. Among 159 persons who were said not to have been vaccinated, 3 cases occurred. Inasmuch as the vaccination records were not adequate it is somewhat difficult to assess the significance of these cases.

Conditions were not suitable for accurate determination of the incubation period. Among a group of 75 patients from whom reliable and observed data could be elicited the average period between immunization and development of hepatitis was 103 days with a range of 75 to 130 days.

The disease was similar to that noted by other observers. Clinically, the disease varied considerably from very mild to extremely severe cases. Onset usually began with headache, pains in the shoulders and back, and frequently with pains in the fingers. A sensation of fullness in the epigastrium was quite characteristic and with this was associated anorexia and nausea. Weakness was a common complaint. Within a day or so the urine was noted to be very dark and within 2 to 3 days icterus of the sclerae appeared. Constipation and clay-colored stools were noted during the period

of jaundice. Vomiting also occurred and varied considerably in severity. Usually vomiting was limited to one or two episodes but in a few instances was persistent, leading to marked dehydration.

TABLE 2.—*Sample survey of Charlotte Amalie, Virgin Islands, showing incidence of jaundice following yellow fever immunization*

Age	Vaccinated population			Unvaccinated population			Total		
	Number surveyed	Number of cases of hepatitis	Percent with hepatitis	Number surveyed	Number of cases of hepatitis	Percent with hepatitis	Number surveyed	Number of cases of hepatitis	Percent with hepatitis
Under 1	31	0	7.5	17	--------	--------	297	20	6.7
1-4	127	11		13	--------				
5-9	107	9		2	--------				
10-14	120	16	11.8	3	--------	--------	260	29	11.3
15-19	125	13		12	--------				
20-24	119	19	18.8	16	--------	--------	236	40	16.9
25-29	88	20		13	1				
30-34	76	20	21.1	11	--------	--------	153	28	18.3
35-39	57	8		9	--------				
40-44	45	8	22.8	6	--------	--------	77	16	20.8
45-49	25	8		1	--------				
50-54	48	9	21.4	4	--------	--------	85	15	17.7
55-59	22	6		11	--------				
60-64	18	2	12.2	13	[2] 1	--------	90	8	8.9
65-69	19	2		10	--------				
70+	12	2		18	1				
	1,039	[1] 153	14.7	159	3	1.9	1,198	156	13.0

[1] Including 12 cases with all signs and symptoms except icterus.
[2] 1 case with all signs and symptoms except icterus.

There were cases which presented only dark urine, anorexia, vomiting, headache, and pains with no frank jaundice, while other cases remained jaundiced for at least a month. The average individual was jaundiced for about 6 to 10 days. The degree of illness did not appear to be closely associated with the duration of icterus as many who were jaundiced for a considerable period were ambulatory throughout the illness, while some who were jaundiced only a few days were bedridden during the period.

It seems evident from the standpoint of the previous history of immunization, the prolonged incubation period, and clinical symptoms that the disease under observation was identical with that previously described and designated as homologous serum jaundice.

Under the conditions of the outbreak it was deemed wise to attempt to limit our collection of possible infectious material to blood or serum which could be shipped under suitable conditions. Many samples were taken and from these nine were selected for experimental use, These are tabulated in table 3.

TABLE 3.—*Data concerning Virgin Islands serums used in pool for experimental groups 2 and 6*

Number	Date vaccinated, 1942	Date jaundiced, 1942	Date bled, 1942	Results of quantitative van den Bergh test	Remarks
				(mg. per 100 cc.)	
6	Mar. 4	June 22	July 6	0.68	
11	Mar. 16	June 28	do	1.07	
30	Mar. 4		July 8	.62	
40	Mar. 20		do	.56	
43	Mar. 6		do	1.16	
47	Mar. 6	July 7	do	.84	
49	Mar. 4		do	.14	Later developed jaundice.
52	Mar. ?	June 18	do		Icteric.
SJA	Apr. 17	July 14	July 17		Do.

EXPERIMENTAL STUDY

Volunteers were obtained in an institution with a population of about 1,700. Those selected were of both sexes in equal numbers and ranging in age from 15 to 57. Groups were inoculated with different materials as explained in table 4.

The following is an explanation of the inoculum used for each group:

Group 1. Lot 331. Yellow fever vaccine in recommended dose. This vaccine contained pooled human serum and is of the same lot which produced jaundice in the United States Army and in the Virgin Islands.

Group 2. Pooled serum collected from nine individuals in the Virgin Islands who had received lot 331 vaccine. Serum was diluted 1:5. Dose 0.5 ml. subcutaneously. See table 3.

Group 3. Lot 367. Dried yellow fever vaccine containing human serum heated in 56° C. water bath for 30 minutes before dilution. Given in recommended dose.

Group 4. Pooled weekly specimens of serum from a mild case of jaundice in group 1. Serum dilution 1:3. Dose 0.5 ml.

Group 5. Pooled weekly specimens of serum from a mild case of jaundice in group 2. Serum dilution 1:3. Dose 0.5 ml.

Group 6. Pool of same serum specimens used in group 2. Serum dilutions 1:3. Dose 0.5 ml. See table 3.

Group 7. Pooled weekly serum specimens from a severely jaundiced patient in group 1. Dilution 1:3. Dose 0.5 ml.

Group 8. Pooled weekly serum specimens from a moderately jaundiced patient in group 1. Dilution 1:3. Dose 0.5 ml.

Group 9. Lot 367. Yellow fever vaccine diluted as recommended and heavily irradiated with ultraviolet light, 1 hour at 2650 Å and 1½ hours at 2537 Å.

Group 10. Pooled weekly serum specimens taken before appearance of jaundice; from patient in group 1. Serum dilution 1:3. Dose 0.5 ml.

Group 11. Single serum specimen from same individual as in group 10. Specimen taken about 2½ months after jaundice had subsided. Serum dilution same as in group 10.

TABLE 4.—*Summary of groups inoculated showing incidence of jaundice*

Group	Number in group	Inoculum	Cases of jaundice		Sex of patient	
			Number	Percent	Male	Female
1	50	Yellow fever vaccine	12	24	6	6
2	10	Pooled Virgin Islands serum	2	20	2	0
3	10	Heated yellow fever vaccine	2	20	1	1
4	10	No. 31 serum	0	0		
5	10	No. 59 serum	0	0		
6	20	Pooled Virgin Islands serum	6	30	3	3
7	20	No. 38 serum	3	15	1	2
8	20	No. 13 serum	1	5	1	
9	10	Irradiated yellow fever vaccine	0	0		
10	14	No. 38 prejaundice serum	4	28.7	2	2
11	15	No. 38 postjaundice serum	0	0		
Total	189		30		16	14

Each serum given was diluted with phosphate buffered normal saline solution, pH 7.6, Berkefeld N filtered and cultured for sterility. Inoculation was always subcutaneous into the arm. The serum used had been stored routinely at 4° C. for varying periods.

All persons inoculated were subsequently bled weekly for 4 to 5 months. The serum was separated the same day and a quantitative van den Bergh test was done (*19*). Readings were made in a comparator using cobaltous sulfate standards.

Total leucocyte counts and differential counts were done weekly on the first few groups. No significant variation due to jaundice was seen in either. Schilling counts were then done routinely each week and these have also failed to show any variation in jaundiced patients.

Moss blood grouping was done for each subject. No correlation between these groups and susceptibility to jaundice was found.

The cephalin-cholesterol flocculation test of Hanger (*20*) has been done weekly on each serum specimen. Invariably the test is strongly positive when clinical jaundice is present. In the subclinical range in our experience, the test may or may not be strongly positive. Many +, ++, +++ reactions have been seen in individuals who were in normal health so far as known. Difco antigen was used.

For statistical purposes jaundice has been considered to be present when the serum bilirubin value was 1.0 mg. percent or higher. Clinical jaundice was usually not seen until the serum bilirubin value was 2.0 mg. percent or higher. A short summary of 30 cases of jaundice is given in table 5.

TABLE 5.—*Statistical summary of cases of jaundice*

	Range	Average	Median	Mode
Incubation period in weeks	4–19	12.8	12	12
Serum bilirubin mg. percent (maximum observed)	1.0–32.0	5.3	3.0	
Duration of jaundice, in weeks	1–7	2.1	2	2

In two cases of jaundice a biphasic rise in serum bilirubin was seen. Both cases occurred in group 1. In one case the first rise occurred after 3 weeks and reached 1.1 mg. percent. In the thirteenth week a second rise to 3.2 mg. occurred with a further rise to 10.0 mg. the following week. In the other case the first rise occurred after 5 weeks, reaching 1.8 mg. in the eighth week with a secondary rise to 1.7 mg. in the fourteenth week.

Clinically most cases were quite mild; epigastric discomfort and nausea were commonly present shortly before jaundice appeared. Vomiting occurred in a few cases. Clay-colored stools and dark urine were present during jaundice. Slight fever up to 100°–101° F. was noted in a few cases. Anorexia was commonly present during jaundice. Most jaundiced patients remained ambulatory. Dermatitis and arthritis were not seen.

So far as known no contact cases of jaundice occurred. Only three cases of jaundice have appeared in 1,500 uninoculated individuals not included in this study during the past 11 months among the institution's population of about 1,700. During one period of 4 months 40 uninoculated individuals having close contact with the inoculated group in which jaundice was occurring were bled weekly and no evidence of jaundice was found.

The duration of jaundice correlated with the severity of the cases. In the 7 cases with the longest duration, ranging from 3 to 7 weeks, the average maximum serum bilirubin observed was 11.7 as compared with the average of 5.3 for the whole group.

Attempts were made to transmit jaundice in animals using materials which produced disease in humans. These included yellow fever vaccine as well as serums derived from patients in the Virgin Islands and from persons exhibiting jaundice produced experimentally. Monkeys, pigs, rabbits, guinea pigs, white rats, Swiss mice, cotton rats, and hamsters were employed. In no instance were we able to produce any illness in experimental animals which could not be accounted for by other agents and no animals became jaundiced as determined by physical or chemical examinations.

Dr. E. W. Goodpasture supplied specimens of liver from fatal cases of jaundice which occurred following the use of vaccines. This material was used an an antigen in complement fixation tests designed to determine whether or not antibodies were present following recovery from this type of hepatitis. In a limited series of tests, negative results were obtained.

COMMENT

It was recognized in 1942 during an epidemic of jaundice in the United States Army that some agent in human serum employed as a diluent in yellow fever vaccine was probably responsible. The yellow

fever vaccine now in use does not contain serum and so far as known has not produced jaundice.

There is an urgent need either for some means of detecting the presence of the jaundice-producing agent in the blood or for some practical method for treating blood products so that the danger of jaundice following their use may be eliminated.

SUMMARY

Results of a sample survey of an epidemic of jaundice occurring subsequent to vaccination against yellow fever in the Virgin Islands in 1942 are given.

Jaundice was produced experimentally by inoculation of two lots of yellow fever vaccine containing pooled human serum.

Jaundice was produced by the inoculation of small amounts of filtered serum from two individuals, and a group of nine individuals who had previously received yellow fever vaccine containing human serum.

The jaundice-producing agent is filterable, survives drying in vacuum, storage for long periods in serum at 4° C., and heating to 56° C. for one-half hour in the dried state.

Evidence is presented that the jaundice-producing agent is present in the blood before jaundice appears, but not 2½ months after disappearance of jaundice.

Evidence is presented suggesting that the jaundice-producing agent may be neutralized by ultraviolet irradiation.

Both sexes are apparently equally susceptible.

Transmission of this type of jaundice by ordinary contact apparently has not occurred during this study.

Attempts to produce jaundice in experimental animals and to develop a complement fixation test were unsuccessful.

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TOXIC EFFECTS OF ATABRINE AND SULFADIAZINE IN GROWING RATS [1]

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When white rats were given atabrine by stomach tube in ascending doses near the limit of tolerance for 2 months and then killed, a striking pathologic picture was found. It is the purpose of this paper to present these changes and to outline the conditions under which they were produced.

Fifty female white rats in individual cages and on a stock diet were divided into five groups of ten rats each. Over a period of approximately 8 weeks the first group (A–1) received atabrine daily by stomach tube. The dose was increased at intervals from 20 mg. to 80 mg. per kg. as indicated in figure 1. After each increase in dosage the average rat weight started to fall but in a few days was rising again, indicating a gradually developed tolerance. The food consumption of this group fell from 11 gm. per day to 8 gm. at the fortieth day and then rose again slightly. The second group (A–2) received the same dosages of atabrine plus riboflavin at a level of 5 mg. for 5 weeks and then 10 mg. per kg. for the remaining 3 weeks. The growth and food consumption curves for groups A–1 and A–2

[1] From the Divisions of Chemotherapy and Pathology, National Institute of Health.

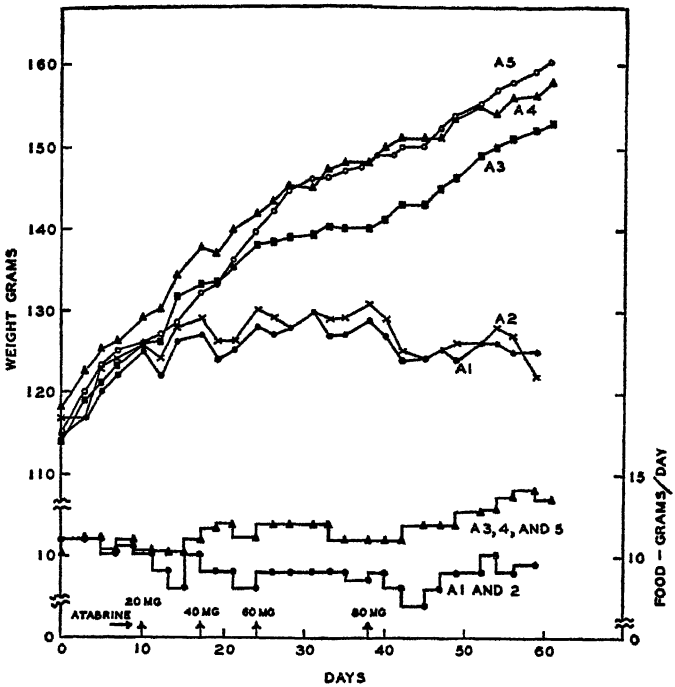

FIGURE 1.—The effect of atabrine on the growth and food consumption of female white rats.

were identical, indicating that supplements of riboflavin had no effect on the toxic action of the atabrine. Group A–4 received water by stomach tube daily and group A–5 was not treated in any way. There was no difference in the growth of food consumption of these two groups. Group A–3 received riboflavin at a level of 5 mg. per kg. for 5 weeks and 10 mg. for the last 3 weeks. The growth and food consumption did not differ significantly from groups A–4 and A–5. When animals from the three latter groups were killed, no gross or microscopic lesions were found.

No significant differences were seen between the two groups (A–1 and A–2, table 1) receiving atabrine. Gross post-mortem examination of the 18 rats which survived to the end of the feeding period showed a general yellow discoloration of the skin and viscera, especially the lower portion of the small intestine and the corticomedullary zone of the kidneys. But the most striking feature was the presence in 13 of the 18 rats of multiple large, pale yellow infarcts of the liver, sometimes involving over half the liver substance. Accompanying these infarcts there were usually more or less extensive, chiefly fibrinous adhesions of the omentum, diaphragm, and body wall.

Histologic alterations were much more widespread and damaging than could be suspected from the gross picture.

TABLE 1.—*Average grade of involvement by organs in rats given atabrine and sulfadiazine severally and in combination*

Number	Organ	Atabrine 60+ mg. per kg.		Atabrine 30 mg. per kg.				Atabrine 30 mg. and sulfadiazine 300 mg. per kg.				Sulfadiazine 300 mg. per kg.				Control
		A-1	A-2	B-1	B-2	B-3	B-4	B-9	B-10	B-11	B-12	B-5	B-6	B-7	B-8	B-13
1	Heart	1.20	1.04	0.30	0.37	0.11	0.05	0.65	0.55	0.52	0.27	0.02	0.04	0.13	0.02	0.04
2	Skeletal muscle	0.90	1.34	0.27	0.25	0.0	0.10	0.57	0.71	0.12	0.30	0.11	0.0	0.0	0.02	0.02
3	Lung interstitial	0.60	0.75	0.56	0.45	0.38	0.40	0.90	0.67	0.50	0.45	0.0	0.0	0.0	0.0	0.05
4	Lung alveolar	1.65	1.25	0.25	0.30	0.18	0.25	0.38	0.44	0.20	0.25	0.0	0.02	0.0	0.0	0.0
5	Liver	3.00	3.62	0.12	0.0	0.0	0.0	0.0	0.0	0.15	0.0	0.0	0.0	0.0	0.0	0.0
6	Kidney glomeruli	1.00	1.19	1.00	0.70	0.45	0.72	0.95	0.86	0.75	0.70	0.05	0.0	0.0	0.0	0.07
7	Kidney tubules	1.52	1.31	1.62	1.50	1.50	1.57	1.50	1.64	1.85	1.35	0.0	0.0	0.0	0.0	0.0
8	Ileum	1.40	1.34	0.0	0.30	0.60	0.65	1.60	0.88	1.61	0.90	0.0	0.0	0.0	0.0	0.0
9	Common mesenteric nodes	1.37	1.44	0.06	0.22	0.11	0.0	1.33	1.31	0.61	0.33	0.0	0.0	0.0	0.0	0.0
10	Spleen	0.40	0.37	0.12	0.0	0.0	0.20	0.35	0.33	0.0	0.0	0.0	0.0	0.05	0.0	0.0
Average of items 1-10		1.31	1.37	0.43	0.41	0.33	0.39	0.82	0.74	0.63	0.45	0.02	0.01	0.02	0.0	0.02
11	Splenic myelosis	1.10	1.09	1.30	0.75	0.69	0.47	0.77	0.43	0.37	0.37	0.69	0.60	0.26	0.60	0.95
12	Hemosiderosis	1.17	1.37	0.57	0.37	0.25	0.32	0.80	0.28	0.35	0.32	0.37	0.27	0.15	0.03	0.24

0.2=trace; 0.5=slight; 1=moderate; 2=marked; 3=extreme. These were the grades used on the individual organs from which the above averages were derived.

The heart usually presented a focal myocarditis largely restricted to the wall of the left ventricle and the interventricular septum. In some animals there were small foci of coagulation necrosis of muscle fibers, in others only isolated oxyphil necrotic fibers. Accompanying or following this fiber necrosis, there appeared an interstitial proliferation of small fibroblasts, enmeshing surviving or necrotic muscle fibers or replacing them entirely. Often slight lymphocyte infiltration accompanied the proliferative process. Occasionally necrotic foci reached 500μ in diameter, but more often comprised only a few fibers. Frequently only isolated coagulated muscle cells were seen.

In addition to these focal lesions, there was sometimes an irregular basophilic reticulation or stippling of muscle fibers throughout or in diffuse patches. Valves were normal.

The lungs presented more or less extensive filling of the alveoli by large round cells with a small round leptochromatic nucleus. Alveoli were often so closely packed that these cells became coherent and polygonal in outline. The cell borders were then distinctly eosinophilic. The exudate cells were commonly mononuclear but sometimes contained two, three, or even five nuclei. Usually the septa were thin, but sometimes they were more or less infiltrated by similar monocytoid cells. This interstitial infiltration was more prominent in areas and in cases where the alveolar exudation was less pronounced.

In addition to this mononuclear cell pneumonia, small vessels often presented a deeply basophilic reticulation of the more or less swollen endothelial cells and of the smooth muscle cells of arterioles. The striated muscle of the pulmonary veins usually lacked this basophilia.

In the liver there were frequent collections of large cells, more often around hepatic venules than elsewhere. Their nuclei were small and leptochromatic. Their cytoplasm was broad and finely granular or reticular. The granules and reticulum were a fairly deep blue-green with eosin-azure, faintly fuchsinophilic and iron-negative with the acid ferrocyanide fuchsin sequence, and negative for fats with Sudan brown or Sudan IV.

The liver infarcts were coagulative in type, showing necrotic cell cords, thrombosed capillaries and marginal infiltration by numerous polymorphonuclear leucocytes, fat-laden macrophages, or both. Sometimes cell cord structure within the infarct was not recognizable and definite fibroblastic granulation tissue proliferation was seen marginally. Arteries and hepatic and portal veins within infarcts were often intact and surrounded by a narrow rim of surviving tissue, but some showed necrosis and thrombosis. Portal areas adjacent to infarcts showed variable grades of fibroblast proliferation and fatty macrophage, leucocyte, and lymphocyte infiltration. The portal veins near the margins of infarcts often showed mural or occluding thrombi of fibrin with or without organization by ingrowing fusiform fibroblasts.

In the kidneys, the epithelium of the glomerular tufts and capsules was often greatly swollen. The cytoplasm of the swollen cells was filled with a fine deep blue reticulum (with eosin-azure), and the glomerular capillaries were compressed and anemic. The glomeruli were fat-free and iron-negative with appropriate special methods. In the corticomedullary zone the clear cytoplasm of the straight tubules contained many fine to fairly coarse, deep blue violet (eosin-azure) granules, often disposed to form a cytoplasmic network. These granules were red with basic fuchsin, gray with iron hematoxylin van Gieson, and iron-negative. These tubules were usually fat-free, but sometimes there was a moderate accompanying fine fat droplet accumulation in the epithelium or in the stroma. Sometimes the basophilic stippling of the epithelium extended to the collecting tubules of the pyramid.

The villi of the midportion of the ileum, often also the jejunum, were swollen and distended by large mononuclear cells. These cells showed small leptochromatic nuclei and broad, finely granular or finely reticular cytoplasm staining blue-green with eosin-azure. Similar cells were often present in the interglandular stroma of the mucosa in the same levels. Clusters of similar blue-green cells were seen in intestinal lymphoid follicles.

Cells of the same type often formed prominent clumps in the pulp of the common mesenteric lymph nodes, especially the ileocecal node. Where closely packed in lymph node pulp, these cells tended to assume polygonal outlines. Some showed a little finely granular Prussian

blue between pale brown granules when the acid ferrocyanide reaction was applied.

A few similar pigmented mononuclear cells were sometimes seen in splenic follicles. The amount of myelosis in the spleen pulp was not materially different from that in control rats. On the average there was moderate pulp hemosiderosis. In some animals the follicular arterioles presented swelling and fine, deeply basophilic reticulation of smooth muscle fibers and endothelium, just as was seen in some of the pulmonary arterioles.

In some of the thigh and leg muscles, there was an irregularly distributed myositis. In this there were irregular interstitial fibroblast proliferation and a muscle fiber necrosis which was usually small in amount and was present in perhaps one-third of the animals. Fiber atrophy and nuclear multiplication occurred in isolated fibers; others were hyaline and waxy in appearance. Multinuclear muscle giant cells were occasionally seen. Interstitial lymphocyte infiltration in affected areas was infrequent. Usually some of the muscles were normal.

Diaphragm and omentum were studied only in those cases in which they were adherent to liver infarcts. In these they showed more or less pronounced interstitial exudation of neutrophil leucocytes, macrophages, and lymphoid cells and proliferation of fibroblasts, just as in the other borders of the infarcts.

In addition to the foregoing, the tibia and femur with knee joint, the adrenal, the esophagus, stomach, duodenum, colon, rectum, pancreas, and mediastinal contents were regularly studied. No significant changes were seen in these structures.

The foregoing changes were those observed with doses of atabrine approaching the limits of toleration. Because of the severity of these lesions, it was deemed necessary to determine the effect of lower dosages. Further, because of the probability of concurrent use in man of atabrine and drugs of the sulfa series, other series of rats were given both atabrine and sulfadiazine.

One hundred and thirty male white rats were divided into 13 groups of 10 rats each, having an average weight of 99 gm. ($\pm$0.5 gm.). The first 4 groups (B–1 to B–4, table 1) were given atabrine daily by stomach tube at a dose level of 30 mg./kg. Group B–1 was fed a diet of ground Purina dog chow; group B–2 received the same plus 10 percent ground whole liver; group B–3 received chow plus 10 percent ground kidney; and group B–4 received chow supplemented by 10 percent liver and 10 percent kidney. The 4 groups gained weight at approximately 3.3 gm. per day, there being no significant difference between the groups (fig. 2). The food consumption fell off for about a week after starting the atabrine, but then returned to a level of 16 to 17 gm. per day which was maintained to the end of the experiment.

The diets of groups B–5, B–6, B–7, and B–8 corresponded to groups B–1, B–2, B–3, and B–4, respectively. These groups were given sulfadiazine (300 mg./kg.) instead of atabrine. The group receiving the chow averaged a gain in weight of approximately 3.3 gm. per day for the first 30 days and then stopped sharply; no more weight was gained in the next 20 days (fig. 3). The groups receiving the liver or kidney averaged a gain of 3.8 gm. per day during the first 33 days and then gained only 5 gm. during the next 17 days. The group receiving liver and kidney averaged a gain in weight of 4.5 gm. per day during the first 33 days and then gained less than 10 gm. during the next 17 days. The food consumption of the sulfadiazine groups started at a level of approximately 16 gm. per day, reached a maximum of 19 gm. per day at about the twenty-fifth day, and then fell to 16 gm. per day at the end of the experiment. Light et al. (*1*) found that inclusion of 0.5 percent sulfadiazine in the diet of rats inhibited the growth after a period of a few weeks.

The diets of groups B–9, B–10, B–11, and B–12 were the same as those of groups 1, 2, 3, and 4, respectively. These 4 groups received atabrine, 30 mg./kg., and sulfadiazine 300 mg./kg., daily by stomach tube. Groups B–9 and B–10 maintained a fairly constant growth rate of 3 gm. per day for 25 days, reached a top weight of approximately 185 gm. at 30 days, and then lost weight during the last 15 days (fig. 4). Groups B–11 and B–12 gained at a rate of 3.3 gm. per day for 30 days and then lost weight during the last 10 days. The food consumption of the atabrine-sulfadiazine animals remained constant at 16 gm. per day until the twenty-fifth day when it began to fall and averaged about 11 gm. at 50 days.

Group B–13 was fed a chow diet and received no drugs. These animals gained an average of 3.3 gm. a day throughout the 50-day period (fig. 5). The food consumption of this group started at about 16 gm. a day and increased to 22 gm. at the fiftieth day.

At autopsy the control series and the animals which had received sulfadiazine alone presented no significant gross or histologic lesions. The lesions observed in those receiving both drugs were not materially different from those in rats receiving 30 mg. atabrine per kg. alone. The purely dietary variations made no evident difference in the severity of the lesions in the 30 mg. atabrine series. With both drugs lesions seemed less severe on the average with both liver and kidney supplements, and most severe with neither supplement (table 1).

With this lower (30 mg. per kg.) dosage of atabrine, liver infarcts and portal thrombosis were absent and pigment cell accumulation in the liver was less frequent and less marked. Renal changes were similar to those previously described but were less severe. The pig-

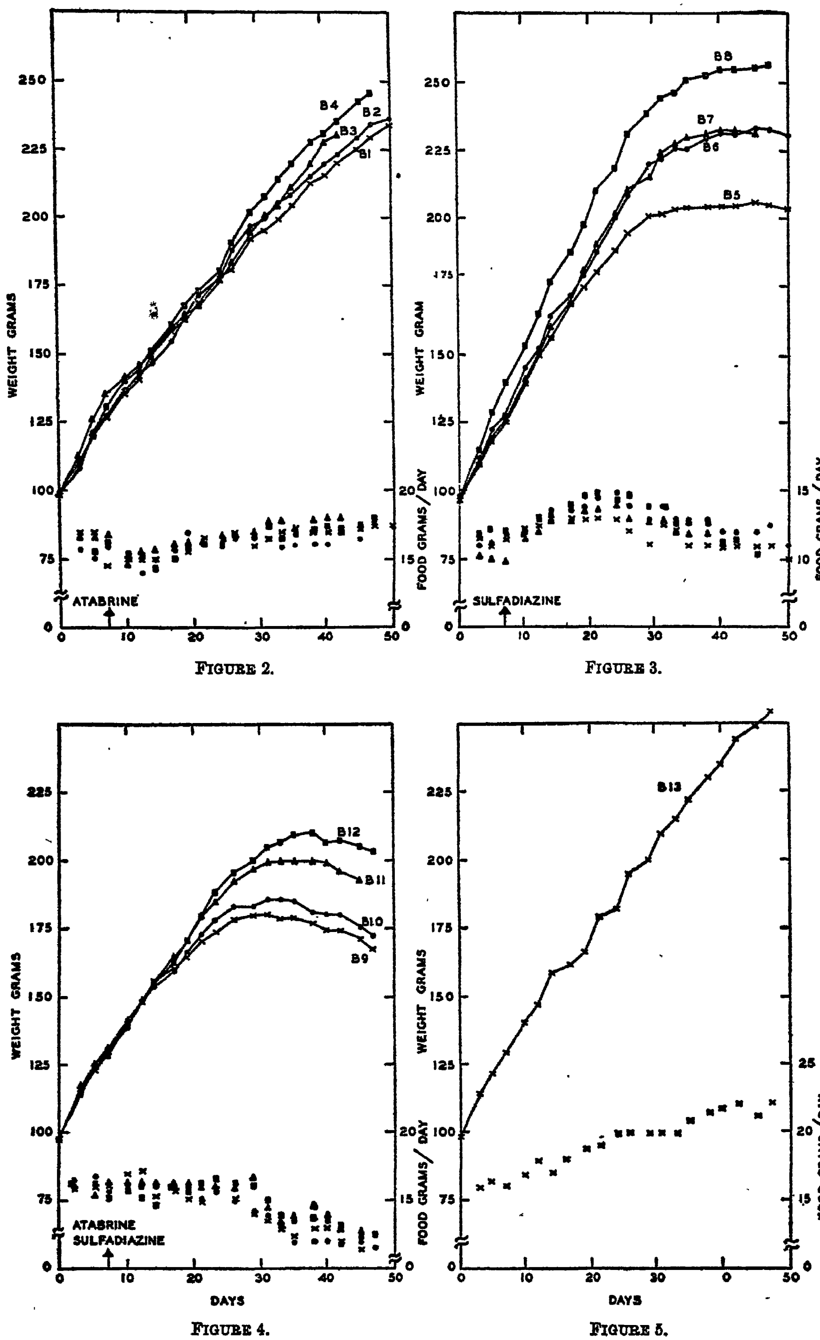

FIGURE 2.

FIGURE 3.

FIGURE 4.

FIGURE 5.

The effect of atabrine and sulfadiazine on the growth and food consumption of male white rats.

ment cell accumulation in the intestinal mucosa was less pronounced and was restricted to one or two of the three levels of the ileum. Pigment cell accumulation in splenic follicles was less frequent and pulp hemosiderosis was relatively slight. Myositis and myocarditis, though often present, were generally less severe, and necrotic muscle fibers were rarely found. In the lungs monocytic exudation was less pronounced and predominantly interstitial rather than intra-alveolar. In table 1 the average grade of involvement for these 13 groups, B–1 to B–13, is compared with that in the first 2 groups, A–1 and A–2, given the very high atabrine dosage.

DISCUSSION

It should be noted that the foregoing pathologic picture was produced only by a very high dosage of atabrine continued over a long period. It is perhaps suggestive that a number of writers have recorded electrocardiographic changes following the use of atabrine both in man and in experimental animals. However, toxic reactions in man are rare; Bispham (*2*) recorded only 38 in nearly 50,000 cases. We have found no record of an autopsy on any person whose death was attributable to atabrine. The only two papers which give any pathology of experimental animals are those of Hecht (*3*) and of Martin, Cominole, and Clark (*4*).

In the course of primarily pharmacologic studies, Hecht noted only yellow staining of the upper small intestine in fatally (acutely) intoxicated rabbits. In cats he noted a well marked enteritis with relaxed hyperemic gut after oral administration; after subcutaneous injection, liver hyperemia and fat deposition in the convoluted tubules (Hauptstücken). (Professor Domagk). This last finding is of little significance as in cats these tubules are usually heavily laden with fat. With chronic intoxication in rabbits and cats, Hecht reported that yellow coloration of skin and mucosae appeared in a few days. He noted that, as measured by its greenish yellow fluorescence in ultraviolet light, much atabrine was present in the site of injection in mice, in the liver, gall bladder, and intestine and, later (24 hours), in the thymus. Little was present in the kidney.

Martin, Cominole, and Clark fed daily doses of atabrine dihydrochloride in warm water by stomach tube to rabbits, cats, and dogs. Dosage varied from 10 to 200 mg. per kg. Treatment continued for 4 days to 7 weeks or until the animals were near death. Killed animals showed emaciation, dehydration, yellow staining of digestive and urinary mucosae and less in liver, pancreas, spleen, and kidney, and still less in other viscera (absent with lower dosage). Only dog tissues were examined microscopically. At 200 mg. dosage (4 doses), there were passive congestion of liver, kidney, spleen, and gastrointestinal mucosa and mild parenchymatous degeneration of liver. There

were no changes in renal glomeruli or tubules. Spleen pulp was relatively anemic, though sinuses were engorged. Moderate to marked mucus secretion of bronchial, gastric, duodenal, and colonic glands was noted. Heart, pancreas, and adrenal were normal. Brown pigment was seen in Kupffer cells of liver on 100–50 mg. dosage and liver cells in centers and midzones of lobules appeared swollen. No necrosis was seen. At 100 mg. dosage (15–27 doses), hyaline casts were seen in renal tubules. Spleen pulp showed many monocytes with granular brown pigment. At 10 mg. dosage the only finding was the "hemosiderin-like" pigment in liver and spleen. The iron content of this pigment was not given.

SUMMARY

Extremely heavy dosage of atabrine produces an arrest of growth and lowered food consumption in rats which is not prevented by riboflavin. At autopsy such rats present pigment cell infiltration of the intestinal mucosa, lymph nodes, spleen, and liver, an interstitial and exudative monocytic pneumonia, a focal myocarditis and myositis, and often portal thrombi and hepatic infarcts. A moderate splenic hemosiderosis and a heavy nonferrous pigmentation of the epithelium of renal glomeruli and medullary tubules are also present. With lesser, but still heavy dosage of 30 mg. per kg. the growth arrest almost vanishes and the lesions are much diminished. Sulfadiazine, alone or in combination with atabrine, produces a late growth arrest but gives little evident gross or microscopic pathologic alteration.

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SICKNESS ABSENTEEISM AMONG MALE AND FEMALE INDUSTRIAL WORKERS, 1933–42, INCLUSIVE [1]

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The quarterly reports for the year 1942 on the frequency of sickness and nonindustrial injuries causing disability for 8 consecutive calendar days or longer among a group of over 250,000 male members

[1] From the Division of Industrial Hygiene, National Institute of Health.

of industrial sick benefit organizations have appeared (*1–4*), the organizations including sick benefit associations, group insurance plans, and company relief departments. The present report records the experience among males and females for the years 1933–42. The last report of the series referring to the experience among females appeared in 1942 (*1*).

Tables 1 and 2 show for males and females, respectively, the variation of the frequency rates according to cause during the 10-year period 1933–42. Attention is directed to the excesses shown for each year by the female rates for all causes and for each broad sickness group when compared with the corresponding rates for the males. The male rate of 106.1 for 1942 for all causes is the highest recorded annual rate since 1933 and is 16 percent greater than the

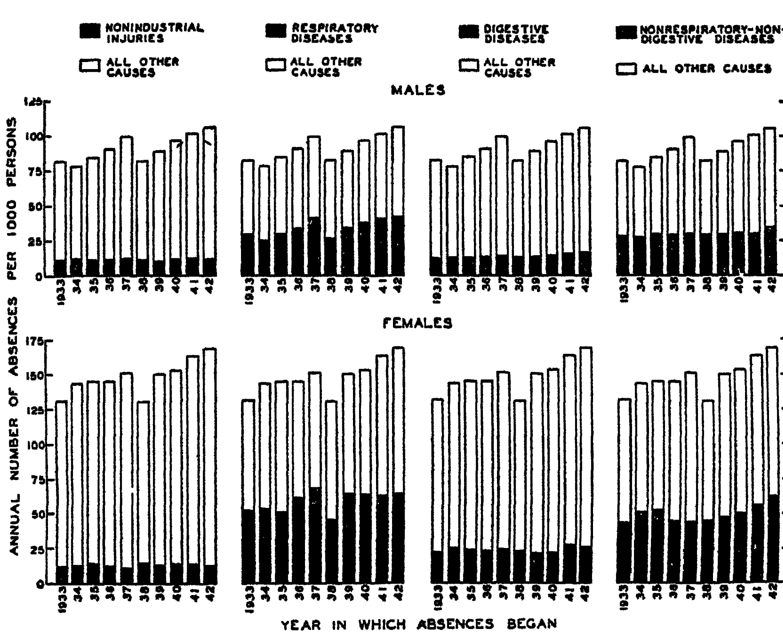

FIGURE 1.—Average annual number of absences per 1,000 persons on account of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, by broad cause group and year in which absences began, experience of MALE and FEMALE employees in various industries, 1933–42, inclusive (Each bar for a particular year represents the average annual frequency from all causes and the contribution made to that frequency by a particular cause group.)

10-year average of 91.1. The female rate of 168.4 for 1942 for all causes is also the highest recorded annual rate since 1933, being almost 60 percent greater than the corresponding male rate and 14 percent in excess of the 10-year average of 148.1. For the males each broad sickness group for 1942 shows a rate that has never been equalled or exceeded since 1933, while for the females only the nonrespiratory-nondigestive group is so characterized.

TABLE 1.—*Average annual number of absences per 1,000 males on account of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, by cause and year in which absences began, experience of* MALE *employees in various industries, 1933–42, inclusive*[1]

Cause (Numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of absences per 1,000 males — Year in which absences began: 1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1933–42[2]
Sickness and nonindustrial injuries	82.3	78.1	85.1	90.7	99.5	82.3	89.0	96.4	101.3	106.1	91.1
Percent of female rate	*63*	*54*	*59*	*63*	*66*	*63*	*59*	*63*	*68*	*63*	*62*
Nonindustrial injuries	11.3	12.3	11.2	11.5	11.8	11.1	10.3	11.8	12.0	11.7	11.5
Sickness	71.0	65.8	73.9	79.2	87.7	71.2	78.7	84.6	89.3	94.4	79.6
Respiratory diseases	28.6	24.5	29.3	33.5	40.9	26.4	33.9	37.7	40.8	41.4	33.7
Tuberculosis of the respiratory system (13)	.8	.8	1.0	.8	.8	.9	.7	.7	.7	.8	.8
Influenza and grippe (33)	15.3	10.1	12.7	15.2	21.4	9.9	16.6	17.5	18.9	15.7	15.3
Bronchitis, acute and chronic (106)	2.9	3.2	3.6	4.8	4.7	4.2	4.1	5.2	5.6	6.5	4.5
Pneumonia, all forms (107–109)	1.8	2.0	2.3	2.6	3.0	2.2	3.0	3.6	3.7	5.5	3.0
Diseases of pharynx and tonsils (115b, 115c)	3.9	4.3	5.1	4.8	5.4	4.5	4.4	4.9	5.5	5.4	4.8
Other respiratory diseases (104, 105, 110–114)	3.9	4.1	4.6	5.3	5.6	4.7	5.1	5.8	6.4	7.5	5.3
Digestive diseases	12.1	12.7	12.9	13.6	13.8	13.4	13.4	14.4	15.4	16.4	13.8
Diseases of stomach except cancer (117, 118)	3.3	3.2	3.6	3.7	4.0	4.1	3.5	3.9	4.2	4.7	3.8
Diarrhea and enteritis (120)	1.0	1.3	1.1	1.3	1.4	.9	1.2	1.4	1.5	1.8	1.3
Appendicitis (121)	3.3	3.9	4.0	4.1	4.4	3.9	4.3	5.0	5.3	5.0	4.3
Hernia (122a)	1.3	1.5	1.4	1.7	1.5	1.7	1.5	1.5	1.5	1.9	1.6
Other digestive diseases (115a, 115d, 116, 122b–129)	3.2	2.8	2.8	2.8	2.5	2.8	2.9	2.6	2.9	3.0	2.8
Nonrespiratory-nondigestive diseases	28.3	27.1	29.7	29.3	30.0	29.4	29.4	30.4	30.2	34.4	29.8
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44)[3]	2.0	2.5	3.0	2.3	2.7	2.1	2.1	1.8	2.5	2.5	2.4
Cancer, all sites (45–55)	.5	.4	.5	.4	.4	.6	.6	.6	.5	.4	.5
Rheumatism, acute and chronic (58, 59)	4.9	4.0	4.0	4.2	4.1	3.7	3.5	4.0	3.7	3.9	4.0
Neurasthenia and the like (part of 84d)	.8	.8	1.2	1.1	1.1	1.0	.9	1.1	1.0	1.1	1.0
Neuralgia, neuritis, sciatica (87b)	2.1	1.8	2.3	2.2	2.2	2.1	2.2	2.3	2.0	2.2	2.2
Other diseases of nervous system (80–85, 87 except part of 84d, and 87b)	1.4	1.4	1.3	1.1	1.0	1.2	1.1	1.0	1.3	1.2	1.2
Diseases of the heart (90–95)	2.1	2.0	2.4	2.3	2.5	2.6	2.9	2.9	2.5	2.7	2.5
Other diseases of the circulatory system (96–103)	2.7	2.5	2.8	3.1	3.0	3.3	3.5	3.7	3.6	4.3	3.2
Nephritis, acute and chronic (130–132)	.5	.5	.5	.4	.5	.5	.4	.4	.4	.4	.5
Other diseases of the genitourinary system (133–138)	2.2	2.4	2.7	2.3	2.3	2.4	2.3	2.7	2.4	2.6	2.4
Diseases of the skin (151–153)	2.7	2.5	2.7	3.0	3.1	3.0	2.7	2.8	2.7	3.1	2.8
Diseases of organs of movement except diseases of joints (156b)	2.8	2.7	2.7	3.2	2.9	2.8	2.6	2.8	2.8	3.0	2.8
All other diseases (56, 57, 60–79, 88, 89, 154, 155, 156a, 157, 162)	3.6	3.6	3.6	3.7	4.2	4.1	4.6	4.3	4.8	7.0	4.3
Ill-defined and unknown causes (200)	2.0	1.5	2.0	2.8	3.0	2.0	2.0	2.1	2.9	2.2	2.3
Average number of persons	152,203	174,643	157,959	170,680	200,967	178,405	188,595	216,621	257,726	287,548	1,985,347

[1] Industrial injuries and venereal diseases are not included.
[2] Average of the 10 annual rates.
[3] Exclusive of influenza and grippe, respiratory tuberculosis, and venereal diseases.

TABLE 2.—*Average annual number of absences per 1,000 females on account of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, by cause and year in which absences began, experience of* FEMALE *employees in various industries, 1933–42, inclusive* [1]

Cause. (Numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of absences per 1,000 females — Year in which absences began										
	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1933–42 [2]
Sickness and nonindustrial injuries	131.3	143.6	144.9	144.9	151.1	130.4	150.0	153.3	163.3	168.4	148.1
Percent of male rate	*160*	*184*	*170*	*160*	*152*	*158*	*169*	*159*	*161*	*159*	*163*
Nonindustrial injuries	11.8	12.5	14.2	12.5	10.9	14.5	13.0	14.0	13.9	12.8	13.0
Sickness	119.5	131.1	130.7	132.4	140.2	115.9	137.0	139.3	149.4	155.6	135.1
Respiratory diseases	51.3	52.9	50.4	61.0	67.8	45.3	63.9	63.5	63.1	63.9	58.3
Tuberculosis of the respiratory system (13)	1.0	1.4	.7	.8	.6	.7	.9	.6	.7	.6	.8
Influenza and grippe (33)	28.1	22.9	22.5	27.7	33.9	16.1	29.9	27.7	28.0	19.0	25.6
Bronchitis, acute and chronic (106)	5.8	6.9	6.3	8.4	7.6	6.7	7.3	8.2	7.1	8.3	7.3
Pneumonia, all forms (107–109)	1.2	1.7	1.1	1.3	1.1	2.1	2.0	1.8	.7	2.9	1.6
Diseases of pharynx and tonsils (115b, 115c)	8.1	12.6	13.0	12.8	13.7	10.5	11.6	12.7	12.0	13.4	12.0
Other respiratory diseases (104, 105, 110–114)	7.1	7.4	6.8	10.0	10.9	9.2	12.2	12.5	14.6	19.7	11.0
Digestive diseases	21.7	24.1	23.5	22.9	23.7	22.4	21.5	21.7	26.9	25.5	23.4
Diseases of stomach except cancer (117, 118)	3.4	3.3	3.0	2.8	2.2	2.7	2.2	1.2	2.7	2.4	2.6
Diarrhea and enteritis (120)	2.1	2.6	3.4	2.2	2.4	2.3	1.6	2.4	2.9	3.1	2.5
Appendicitis (121)	8.6	10.6	10.2	12.0	13.8	10.4	11.9	12.1	15.6	13.5	11.9
Hernia (122a)	.1	.5	.5	.4	.4	.5	.5	.3	.2	.4	.4
Other digestive diseases (115a, 115d, 116, 122b–129)	7.5	7.1	6.4	5.5	4.9	6.5	5.3	5.7	5.5	6.1	6.0
Nonrespiratory-nondigestive diseases	43.2	50.7	51.8	44.0	43.8	44.2	46.9	50.1	54.9	62.0	49.2
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44) [3]	2.9	3.7	5.4	2.9	3.1	3.6	2.3	2.6	4.1	4.8	3.5
Cancer, all sites (45–55)	.4	.7	.2	.3	.3	.6	.5	.5	.3	.5	.4
Rheumatism, acute and chronic (58, 59)	3.5	3.4	3.4	3.3	2.9	3.6	2.4	3.1	3.3	3.1	3.2
Neurasthenia and the like (part of 84d)	5.1	5.6	6.7	6.5	5.4	5.5	5.7	5.4	6.2	8.6	6.1
Neuralgia, neuritis, sciatica (87b)	2.3	2.9	2.7	2.0	2.4	1.2	2.1	2.6	2.5	2.8	2.4
Other diseases of nervous system (80–85, 87, except part of 84d, and 87b)	1.2	2.1	.7	.5	1.0	.6	1.2	1.5	1.3	1.1	1.1
Diseases of the heart (90–95)	2.0	2.2	1.7	1.1	1.3	1.4	1.8	1.7	1.8	1.4	1.6
Other diseases of the circulatory system (96–103)	2.1	2.7	2.8	2.3	3.5	3.7	3.2	3.6	4.7	4.6	3.3
Nephritis, acute and chronic (130–132)	.6	.1	.5	.3	.2	.3	.5	.6	.5	0	.4
Other diseases of the genitourinary system (133–139)	9.9	11.1	11.5	8.9	9.3	8.9	9.5	10.2	10.6	11.6	10.2
Diseases of the skin (151–153)	2.9	4.1	3.4	3.1	3.3	2.3	3.3	3.4	3.9	4.6	3.4
Diseases of organs of movement except diseases of joints (156b)	1.3	1.7	2.5	1.7	1.3	1.5	1.4	2.2	2.4	3.7	2.0
All other diseases (56, 57, 60–79, 88, 89, 154, 155, 156a, 157, 162)	9.0	10.4	10.3	11.1	9.8	11.0	13.0	12.7	13.3	15.2	11.6
Ill-defined and unknown causes (200)	3.3	3.4	5.0	4.5	4.9	4.0	4.7	4.0	4.5	4.2	4.2
Average number of persons	14,587	15,644	15,049	15,181	16,921	15,203	15,343	16,318	18,008	18,835	161,089

[1] Industrial injuries and venereal diseases are not included.
[2] Average of the 10 annual rates.
[3] Exclusive of influenza and grippe, respiratory tuberculosis, and venereal diseases.

There are certain specific causes for the males which show for 1942 the highest rates for the 10-year period and at the same time yield relatively high excesses when compared with the corresponding averages for 1933–42. These causes with their excesses are pneumonia, 83 percent; bronchitis, 44 percent; and diarrhea and enteritis, 38 percent. The corresponding causes for the females are diseases of the organs of locomotion except diseases of the joints, 85 percent; pneumonia, 81 percent; and neurasthenia, 41 percent.

The contribution made by each broad cause group to the frequency for all causes is of considerable interest. This contribution is shown graphically in figure 1 for each of the 10 years and for each sex.

The figure shows clearly for each sex that the frequency for all causes rose since 1938, the almost constant rate of increase being evident in the instance of the males. Most striking from year to year is the variation of the male rates for the respiratory diseases, the variation of these rates being definitely reflected in the rates for all causes. For the females, on the other hand, this positive correlation between the variation of the rates for one cause group and that for all causes is not shown by the respiratory group but rather by the nonrespiratory-nondigestive group of diseases particularly since 1938; it is noteworthy that the principal causes determining the movement of the nonrespiratory-nondigestive diseases during the 10-year period are "other diseases of the genitourinary system" and neurasthenia.

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(4) ————: Sickness absenteeism among industrial workers, final quarter of 1942, with a note on the occurrence of bronchitis and pneumonia, 1933–42. Pub. Health Rep., 58: 677-679 (Apr. 23, 1943).

DEATHS DURING WEEK ENDED JULY 31, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 31, 1943	Corresponding week, 1942
Data from 90 large cities of the United States:		
Total deaths	8,305	7,478
Average for 3 prior years	8,289	
Total deaths, first 30 weeks of year	284.120	258,770
Deaths under 1 year of age	705	571
Average for 3 prior years	573	
Deaths under 1 year of age, first 30 weeks of year	19,970	16,984
Data from industrial insurance companies:		
Policies in force	65,668,828	64,944,397
Number of death claims	11,594	10,665
Death claims per 1,000 policies in force, annual rate	9.2	8.6
Death claims per 1,000 policies, first 30 weeks of year, annual rate	10.2	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 7, 1943

Summary

For the current week a total of 450 cases of poliomyelitis was reported, as compared with 361 for the preceding week and a 5-year (1938–42) median of 197. Increases occurred in 23 States. The largest numbers of cases, aggregating 359, or 80 percent of the total, were reported in 8 States, 7 of which accounted for most of the increase, as follows (last week's figures in parentheses): California, 111 (104); Texas, 62 (105); Oklahoma, 52 (30); Kansas, 43 (30); Illinois, 34 (6); Connecticut, 24 (7); New York, 18 (10); and Colorado, 15 (0). No other State reported more than 8 cases. The accumulated total for the first 31 weeks of the year is 2,776, as compared with a corresponding 5-year median of 1,403 and with 1,852 in 1941, the largest number for the corresponding period in the past 5 years.

A total of 201 cases of meningococcus meningitis was reported, as compared with 203 last week and a 5-year median of 33. States reporting the largest numbers (last week's figures in parentheses) are as follows: New York, 27 (36); California, 24 (9); Pennsylvania, 19 (16); Illinois, 18 (14); Massachusetts, 12 (10). No other State reported more than 9 cases. The cumulative total for the first 31 weeks of the year is 13,183, as compared with 2,307 for the same period last year, and a 5-year median of 1,359.

Of a total of 232 cases of typhoid fever, as compared with 237 last week and 379 for the 5-year median, 22 occurred in Ohio (9 in Toledo, in which city 56 cases were reported for the 4-week period ended July 31). The cumulative total for the country as a whole for the first 31 weeks of the year is 2,893, as compared with 3,595 for the same period last year and a 5-year median of 4,208.

Deaths registered for the week in 89 large cities of the United States totaled 8,149, as compared with 8,292 last week and a 3-year (1940–42) average of 7,404. The accumulated total for the first 31 weeks of the year is 291,784, as compared with 265,640 for the corresponding period of 1942.

For the first half of 1943 the provisional death rate for the United States is 11.0 per 1,000 population, as compared with 10.6 for the same period last year, and the provisional birth rate is 21.7 as compared with 19.1 last year.

Telegraphic morbidity reports from State health officers for the week ended Aug. 7, 1943, and comparison with corresponding week of 1942, and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Aug. 7, 1943	Aug. 8, 1942		Aug. 7, 1943	Aug. 8, 1942		Aug. 7, 1943	Aug. 8, 1942		Aug. 7, 1943	Aug. 8, 1942	
NEW ENGLAND												
Maine	0	0	0	------	------	------	37	27	27	1	2	0
New Hampshire	0	0	0	------	------	------	3	10	3	1	0	0
Vermont	0	0	0	------	------	------	17	32	14	0	0	0
Massachusetts	2	5	2	------	------	------	114	91	125	12	8	1
Rhode Island	0	1	1	------	------	------	62	11	11	1	0	0
Connecticut	0	0	0	1	2	1	40	18	18	3	0	0
MIDDLE ATLANTIC												
New York	5	6	15	[1] 2	------	[1] 1	401	176	234	27	16	6
New Jersey	1	1	3	5	------	1	166	49	49	7	2	0
Pennsylvania	7	5	6	------	------	------	55	39	117	19	4	3
EAST NORTH CENTRAL												
Ohio	1	8	6	3	8	3	135	46	46	2	0	0
Indiana	3	3	5	8	------	------	21	7	7	3	0	0
Illinois	7	11	12	7	4	3	129	19	25	18	2	2
Michigan [2]	1	3	5	------	10	4	162	37	122	9	2	2
Wisconsin	4	1	1	------	20	10	239	109	175	5	0	0
WEST NORTH CENTRAL												
Minnesota	2	0	1	------	1	------	32	13	15	0	0	0
Iowa	4	10	1	------	------	------	16	20	25	2	0	0
Missouri	2	4	4	------	7	2	11	8	8	5	3	0
North Dakota	0	0	1	4	------	1	32	2	2	3	0	0
South Dakota	1	0	1	------	------	------	12	12	1	0	2	0
Nebraska	1	0	0	------	3	------	6	3	3	0	0	0
Kansas	2	0	2	1	------	1	15	30	15	3	0	1
SOUTH ATLANTIC												
Delaware	0	3	0	------	------	------	4	0	0	0	0	0
Maryland [2]	3	5	1	2	1	1	31	70	13	4	4	1
District of Columbia	1	2	2	------	1	------	22	2	5	0	1	0
Virginia	7	7	15	75	33	16	48	11	43	7	1	1
West Virginia	2	5	3	------	------	2	9	4	6	1	1	1
North Carolina	9	11	11	3	------	------	11	9	26	3	0	1
South Carolina	4	3	3	207	70	67	21	11	11	2	2	1
Georgia	12	9	9	9	5	5	13	6	11	3	0	0
Florida	3	3	3	4	4	1	3	6	6	2	0	0
EAST SOUTH CENTRAL												
Kentucky	0	7	5	1	------	1	5	5	5	6	0	2
Tennessee	1	3	3	1	2	6	6	9	9	4	2	1
Alabama	12	4	9	17	9	9	7	10	12	3	0	1
Mississippi [2]	1	3	4	------	------	------	------	------	------	1	2	1
WEST SOUTH CENTRAL												
Arkansas	4	5	5	3	3	5	9	7	7	0	1	0
Louisiana	0	3	3	1	3	3	1	5	2	1	0	0
Oklahoma	2	2	2	2	15	9	5	4	4	1	1	0
Texas	18	19	21	190	79	79	54	29	34	5	1	1
MOUNTAIN												
Montana	1	0	0	------	------	------	28	19	17	1	0	0
Idaho	0	1	1	------	------	------	21	46	4	0	0	0
Wyoming	0	0	1	2	5	------	5	13	3	1	0	0
Colorado	1	0	8	7	11	7	13	17	13	0	0	0
New Mexico	1	0	0	------	------	------	4	4	4	0	0	0
Arizona	1	0	1	28	14	14	6	23	13	1	0	0
Utah [2]	0	0	0	------	------	------	22	49	19	0	0	0
Nevada	0	0	------	------	2	------	11	16	------	0	0	------
PACIFIC												
Washington	7	4	1	------	------	------	15	157	11	9	0	0
Oregon	2	2	1	------	2	3	21	21	15	1	2	0
California	10	10	15	22	20	10	151	164	164	24	6	1
Total	145	169	169	605	334	334	2,251	1,476	1,752	201	65	33
31 weeks	6,888	7,084	8,535	80,678	80,025	151,020	533,746	464,760	464,760	13,183	2,307	1,359

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Aug. 7, 1943, and comparison with corresponding week of 1942, and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended Aug. 7, 1943	Week ended Aug. 8, 1942	Median 1938–42	Week ended Aug. 7, 1943	Week ended Aug. 8, 1942	Median 1938–42	Week ended Aug. 7, 1943	Week ended Aug. 8, 1942	Median 1938–42	Week ended Aug. 7, 1943	Week ended Aug. 8, 1942	Median 1938–42
NEW ENGLAND												
Maine	0	1	1	8	8	8	0	0	0	0	1	2
New Hampshire	0	0	0	1	3	1	0	0	0	0	1	0
Vermont	2	0	0	2	3	2	0	0	0	0	0	0
Massachusetts	0	0	1	53	49	31	0	0	0	5	4	3
Rhode Island	6	0	0	3	2	2	0	0	0	1	0	0
Connecticut	24	2	1	11	11	6	0	0	0	1	3	3
MIDDLE ATLANTIC												
New York	18	5	9	79	58	71	0	0	0	9	6	13
New Jersey	1	7	3	7	19	20	0	0	0	3	2	5
Pennsylvania	1	3	3	47	51	51	0	0	0	10	8	14
EAST NORTH CENTRAL												
Ohio	6	9	9	55	49	50	0	0	0	22	8	17
Indiana	1	2	2	11	9	9	0	0	0	1	1	4
Illinois	34	22	7	25	41	46	2	0	2	7	5	20
Michigan [2]	4	7	8	12	32	52	0	0	1	6	3	4
Wisconsin	1	0	0	27	55	38	0	0	0	2	1	1
WEST NORTH CENTRAL												
Minnesota	6	1	2	10	19	19	0	0	1	1	0	0
Iowa	1	0	2	18	11	11	0	0	4	1	3	5
Missouri	7	4	1	14	14	14	0	2	1	17	18	10
North Dakota	0	0	0	0	4	4	0	0	0	1	0	0
South Dakota	1	0	1	6	16	7	0	0	1	1	0	0
Nebraska	3	3	1	6	1	3	0	0	0	1	0	0
Kansas	43	3	3	10	8	15	0	0	0	3	5	5
SOUTH ATLANTIC												
Delaware	0	0	0	2	1	1	0	0	0	0	1	0
Maryland [2]	0	0	1	14	11	9	0	0	0	0	9	9
District of Columbia	0	0	0	4	7	2	0	0	0	0	0	0
Virginia	2	1	2	6	5	9	0	0	0	7	15	15
West Virginia	0	5	1	17	9	9	0	0	0	6	4	5
North Carolina	2	2	2	17	10	10	0	0	0	6	10	13
South Carolina	0	2	2	8	2	2	0	0	0	10	8	14
Georgia	1	1	2	11	10	10	0	0	0	19	6	28
Florida	0	1	1	4	0	2	0	0	0	2	2	4
EAST SOUTH CENTRAL												
Kentucky	8	8	6	11	12	16	0	0	0	16	13	14
Tennessee	0	19	3	9	19	11	0	0	0	6	7	12
Alabama	1	2	1	9	11	13	0	0	0	5	3	11
Mississippi [2]	2	0	1	3	1	6	0	0	0	9	14	13
WEST SOUTH CENTRAL												
Arkansas	4	6	2	6	4	3	0	0	1	4	8	29
Louisiana	4	1	1	1	6	5	0	0	0	6	10	13
Oklahoma	52	0	0	2	19	8	0	0	0	11	8	19
Texas	62	4	4	18	15	14	0	0	0	17	32	37
MOUNTAIN												
Montana	0	0	0	4	3	3	0	0	0	0	1	1
Idaho	0	0	0	33	0	1	0	0	0	0	0	0
Wyoming	0	0	0	9	7	1	0	0	0	1	0	0
Colorado	15	1	1	10	5	8	0	0	0	1	1	1
New Mexico	5	2	1	0	1	3	0	0	0	3	3	5
Arizona	1	1	0	3	2	1	0	0	0	2	2	1
Utah [2]	6	0	0	7	0	3	0	0	0	0	2	2
Nevada	2	0	------	1	0	------	0	0	------	0	0	------
PACIFIC												
Washington	5	0	1	24	8	8	0	0	0	2	0	2
Oregon	8	0	1	7	3	6	0	0	0	2	0	2
California	111	3	8	99	39	40	0	0	0	5	10	10
Total	450	128	197	744	673	705	2	2	34	232	233	370
31 weeks	2,766	1,149	1,403	96,206	87,954	115,033	600	604	1,927	2,893	3,595	4,208

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Aug. 7, 1943, and comparison with corresponding week of 1942, and 5-year median—Con.

Division and State	Whooping cough, Week ended Aug. 7, 1943	Whooping cough, Week ended Aug. 8, 1942	Whooping cough, Median 1938-42	Week ended Aug. 7, 1943: Anthrax	Dysentery, Amebic	Dysentery, Bacillary	Dysentery, Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	16	23	23	0	0	0	0	0	0	0	0	0
New Hampshire	2	7	1	0	0	0	0	0	0	0	0	0
Vermont	19	68	35	0	0	0	0	0	0	0	0	0
Massachusetts	53	208	115	0	0	0	0	0	0	0	0	0
Rhode Island	35	15	14	0	0	0	0	0	0	0	0	0
Connecticut	33	56	56	0	0	9	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	249	347	347	0	3	9	0	2	0	2	0	3
New Jersey	149	215	215	0	1	0	0	0	0	0	0	0
Pennsylvania	228	257	436	0	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	252	260	343	0	0	0	0	0	0	6	0	0
Indiana	42	46	17	0	0	0	0	0	0	0	0	0
Illinois	195	334	328	0	0	1	0	2	0	0	1	0
Michigan [2]	257	177	272	0	0	0	0	0	0	0	0	0
Wisconsin	322	242	225	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	110	67	51	0	2	0	1	0	0	0	0	0
Iowa	41	32	32	0	0	0	0	0	0	0	0	0
Missouri	40	11	28	0	0	0	1	0	0	0	2	0
North Dakota	21	11	11	0	0	0	0	2	0	0	0	0
South Dakota	3	0	5	0	0	0	0	0	0	0	0	0
Nebraska	7	6	7	0	0	0	0	0	0	0	0	0
Kansas	59	57	57	0	0	0	0	2	0	0	1	1
SOUTH ATLANTIC												
Delaware	0	2	2	1	0	0	0	0	0	1	0	0
Maryland [2]	108	60	62	0	0	0	6	0	0	2	0	0
District of Columbia	28	24	20	0	0	0	0	0	0	0	0	0
Virginia	72	40	50	0	0	0	315	0	0	5	2	0
West Virginia	84	11	21	0	0	0	0	0	0	0	0	0
North Carolina	199	85	111	0	0	57	0	0	0	4	0	0
South Carolina	115	52	52	0	0	43	0	0	0	0	0	7
Georgia	20	13	26	0	1	16	2	0	0	0	1	32
Florida	11	8	16	0	0	0	1	0	0	0	0	7
EAST SOUTH CENTRAL												
Kentucky	33	101	61	0	0	10	0	0	0	0	0	0
Tennessee	50	27	49	0	0	0	13	1	0	0	3	2
Alabama	35	7	22	0	0	0	0	0	0	1	0	36
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	3
WEST SOUTH CENTRAL												
Arkansas	39	8	8	1	7	47	0	0	0	0	2	0
Louisiana	5	2	17	0	1	0	0	0	0	0	0	5
Oklahoma	5	7	18	0	0	0	0	0	0	0	0	0
Texas	245	134	150	0	28	351	0	3	1	0	0	59
MOUNTAIN												
Montana	17	34	29	0	0	0	0	0	0	0	0	0
Idaho	6	7	7	0	0	0	0	0	0	0	0	0
Wyoming	6	4	5	0	0	0	0	0	0	0	0	0
Colorado	72	30	30	0	0	13	0	0	0	0	0	0
New Mexico	0	12	15	0	1	2	4	0	0	0	1	0
Arizona	15	12	16	0	0	0	13	0	0	0	0	0
Utah [2]	84	16	52	0	0	0	0	0	0	0	3	0
Nevada	0	13	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	35	64	64	0	0	0	0	0	0	0	0	0
Oregon	44	16	19	0	0	0	0	0	0	0	0	0
California	182	185	186	0	0	10	0	10	0	0	0	0
Total	3,643	3,413	3,698	2	44	568	356	22	1	21	16	155
31 weeks	125,517	116,280	120,862	39	1,269	9,254	3,872	376	18	300	560	1,923
31 weeks, 1942				55	652	4,928	3,745	280	34	346	613	1,506

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 3; Connecticut, 1; New York, 2; New Jersey, 2; Illinois, 1; Michigan, 1; Virginia, 1; South Carolina, 1; Georgia, 7; Louisiana, 1; Texas, 5; California, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 24, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	6	0	1	0	0	0	0	1
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	5	0	------	1	32	4	7	0	27	0	2	27
Fall River	0	0	------	0	2	0	0	0	2	0	0	1
Springfield	0	0	------	0	3	0	0	0	1	0	0	1
Worcester	0	0	------	0	2	1	4	0	10	0	0	5
Rhode Island:												
Providence	0	0	1	1	66	2	0	1	7	0	0	41
Connecticut:												
Hartford	0	0	------	0	0	0	1	0	0	0	0	2
New Haven	0	0	------	0	17	0	1	1	0	0	0	6
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	4	0	6	0	3	0	0	15
New York	9	0	2	0	318	16	49	5	30	0	3	86
Rochester	0	0	------	0	6	2	5	0	1	0	0	5
Syracuse	0	0	------	0	6	1	2	0	4	0	0	12
New Jersey:												
Camden	0	0	------	1	0	0	0	0	0	0	0	0
Newark	0	0	1	0	31	3	2	1	1	0	0	40
Trenton	0	0	------	0	0	0	2	0	1	0	0	2
Pennsylvania:												
Philadelphia	0	0	------	0	3	8	13	0	11	0	0	95
Pittsburgh	2	0	------	0	7	2	3	0	10	0	2	27
Reading	0	0	------	0	1	0	0	0	1	0	0	5
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	1	0	3	2	7	1	3	0	0	11
Cleveland	2	0	1	0	15	2	7	1	17	0	0	44
Columbus	0	0	------	0	23	1	0	0	1	0	0	16
Indiana:												
Fort Wayne	1	0	------	0	3	0	0	0	0	0	1	0
Indianapolis	0	0	------	1	10	0	8	0	2	0	0	22
South Bend	1	0	------	0	1	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	1	0	1	0	0	0	0	0
Illinois:												
Chicago	5	0	------	0	88	5	14	2	12	0	1	83
Springfield	0	0	------	0	1	0	0	0	0	0	0	0
Michigan:												
Detroit	3	0	------	0	85	3	10	1	8	2	5	90
Flint	1	0	------	0	7	0	0	0	3	0	0	5
Grand Rapids	0	0	------	0	41	0	0	0	0	0	0	32
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	2	0	0	1
Milwaukee	0	0	------	0	63	0	0	0	16	0	0	53
Racine	0	0	------	0	2	0	0	0	0	0	0	2
Superior	0	0	------	0	24	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	49	0	1	0	1	0	0	3
Minneapolis	0	0	------	0	6	0	3	0	4	0	0	2
St. Paul	0	0	------	0	14	0	7	0	1	0	0	59
Missouri:												
Kansas City	1	0	------	0	6	2	13	2	4	0	0	3
St. Joseph	0	0	------	0	1	0	0	0	1	0	0	0
St. Louis	0	0	------	0	14	8	0	0	0	0	2	17

City reports for week ended July 24, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	6	0	1	0	0	0	0	7
Nebraska:												
Omaha	1	0	------	0	0	0	2	0	0	0	0	1
Kansas:												
Topeka	0	0	------	0	4	0	0	0	0	0	0	5
Wichita	0	0	------	0	3	0	1	2	1	0	0	8
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	0	0	0	0	0	0
Maryland:												
Baltimore	0	1	1	0	40	5	8	1	10	0	1	95
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	34	1	5	0	3	0	0	54
Virginia:												
Lynchburg	0	0	------	0	2	0	0	0	1	0	0	14
Richmond	1	0	------	0	5	1	1	0	1	0	0	8
Roanoke	0	0	------	0	0	0	0	0	0	0	0	5
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	1	0
Wheeling	0	0	------	0	0	0	1	0	0	0	0	11
North Carolina:												
Raleigh	0	0	------	0	0	0	0	0	0	0	0	0
Winston-Salem	1	0	------	0	1	0	1	0	0	0	0	31
South Carolina:												
Charleston	0	0	3	0	1	1	2	0	0	0	0	0
Georgia:												
Atlanta	0	0	2	0	0	0	2	1	3	0	0	1
Brunswick	0	0	------	0	0	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	0	0	0	0
Florida:												
Tampa	0	0	------	0	1	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	------	1	2	0	2	0	1	0	0	13
Nashville	0	0	------	0	1	0	5	0	0	0	0	13
Alabama:												
Birmingham	0	0	------	1	1	0	4	0	2	0	4	4
Mobile	0	0	------	0	0	0	2	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	1	0	0	0	1	0	1	2
Louisiana:												
New Orleans	1	0	5	1	7	0	7	0	1	0	2	6
Shreveport	0	0	------	0	0	0	5	1	1	0	1	0
Texas:												
Dallas	0	0	------	0	4	0	3	5	0	0	1	6
Galveston	0	0	------	0	0	0	1	1	0	0	0	0
Houston	0	0	------	0	0	0	3	3	3	0	1	3
San Antonio	0	0	------	0	0	0	7	1	0	0	0	2
MOUNTAIN												
Montana:												
Billings	0	0	------	0	7	0	0	0	0	0	0	0
Helena	0	0	------	0	3	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	5	0	0	0	2	1	1	0	0	22
Pueblo	0	0	------	0	0	0	1	0	0	0	0	3
Utah:												
Salt Lake City	0	0	------	0	2	0	2	0	3	0	0	31

City reports for week ended July 24, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	1	0		1	11	0	2	1	3	0	0	26
Spokane	0	0		0	8	2	1	0	4	0	0	15
Tacoma	0	0		0	1	0	0	0	1	0	0	1
California:												
Los Angeles	0	0	6	0	55	4	4	13	16	0	0	43
Sacramento	0	1		0	1	0	0	4	0	0	0	8
San Francisco	0	0	1	0	19	3	3	3	3	0	0	14
Total	37	2	29	8	1,182	79	247	52	243	2	28	1,266
Corresponding week, 1942	48	5	30	6	748	19	293	24	225	2	35	1,421
Average, 1938-42	56		28	[1] 7	[2] 811		[1] 238		278	2	40	1,364

[1] 3-year average, 1940-42.
[2] 5-year median.

Dysentery, amebic.—Cases: Boston, 1; New York, 1; Los Angeles, 1.
Dysentery, bacillary.—Cases: Buffalo, 4; New York, 7; Syracuse, 1; Cincinnati, 1; Detroit, 2; Baltimore, 2; Washington, 1; Richmond, 1; Charleston, S. C., 43; Nashville, 4; Los Angeles, 7.
Dysentery, unspecified.—Cases: Washington, 1; Birmingham, 1; San Antonio, 10.
Leprosy.—Cases: New Orleans, 1.
Rocky Mountain spotted fever.—Cases: St. Louis, 1.
Tularemia.—Cases: Chicago, 1.
Typhus fever.—Cases: Charleston, S. C., 5; Brunswick, 1; Savannah, 2; Birmingham, 1; Little Rock, 1; New Orleans, 2; Shreveport, 1; Dallas, 2; Houston, 6.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,541,100)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever, case rates	Whooping cough case rates
			Case rates	Death rates								
New England	13.4	0.0	2.7	5.4	344	18.8	37.6	5.4	126.2	0.0	5.4	226
Middle Atlantic	4.9	0.0	1.3	0.4	168	14.3	36.6	2.7	27.7	0.0	2.2	128
East North Central	7.6	0.0	1.2	0.6	214	7.6	27.4	2.9	37.4	1.2	4.1	210
West North Central	3.9	0.0	0.0	0.0	201	19.5	54.7	7.8	23.5	0.0	3.9	205
South Atlantic	3.4	1.7	10.3	0.0	145	13.7	35.9	3.4	30.8	0.0	3.4	374
East South Central	5.9	0.0	0.0	11.9	24	0.0	77.2	0.0	17.8	0.0	23.8	178
West South Central	2.9	0.0	14.7	2.9	35	0.0	76.3	32.3	17.6	0.0	17.6	56
Mountain	8.4	0.0	42.0	0.0	101	0.0	50.4	8.4	33.6	0.0	0.0	471
Pacific	1.7	1.7	12.2	1.7	166	15.7	17.5	36.7	47.2	0.0	0.0	187
Total	5.6	0.3	4.4	1.2	178	11.9	37.3	7.8	36.7	0.3	4.2	191

PLAGUE INFECTION IN GRANT COUNTY, OREG.

Plague, infection has been reported proved in tissue from 1 ground squirrel, *C. oregonus*, taken June 20, 1943, on State Highway No. 70, south of Seneca, Grant County, Oreg.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on June 30, 1943, in Paauhau, Hamakua District, Island of Hawaii, T. H., has been proved positive for plague. Two rats found on July 9 and July 13, respectively, in the Makawao District, Island of Maui, T. H., have also been proved positive for plague. A delayed report states that 2 plague-infected rats were found on November 27, 1942, and March 23, 1943, respectively, in Makawao District, Island of Maui, T. H.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 10, 1943.—During the week ended July 10, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		13	1	73	112	18	39	18	48	322
Diphtheria		8	6	16	1	6				37
Dysentery (bacillary)				2						2
German measles		1		5	38	2	3	7	12	68
Influenza		3			20				6	29
Measles		83	3	139	642	70	55	232	98	1,322
Meningitis, meningococcus				1	2				2	5
Mumps		55	2	17	153	34	21	32	28	342
Poliomyelitis					1					1
Scarlet fever		13	11	68	54	26	17	21	9	219
Smallpox								1		1
Tuberculosis (all forms)	3	8	8	92	50	12	9	3	13	198
Typhoid and paratyphoid fever				23	2	1				26
Undulant fever				1	2				1	4
Whooping cough				93	100	24	17	42	29	305

SWEDEN

Notifiable diseases—May 1943.—During the month of May 1943, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	8	Poliomyelitis	15
Diphtheria	140	Scarlet fever	2,551
Dysentery	90	Syphilis	55
Gonorrhea	1,561	Undulant fever	7
Hepatitis, epidemic	381	Weil's disease	4
Paratyphoid fever	154		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Basutoland.—An outbreak of pneumonic plague occurred in Basutoland between June 12 and June 30, 1943, in a native village 18 miles south of Mafeteng. The number of cases was not stated in the report but all cases proved fatal.

Peru—Libertad Department.—During the month of May 1943, 3 cases of plague with 2 deaths were reported in the city of Trujillo, Libertad Department, Peru. No human cases were reported for the month of June 1943, though plague-infected rats were found in the same locality.

Smallpox

Algeria.—For the period June 21–30, 1943, 78 cases of smallpox were reported in Algeria.

Indochina.—For the period June 21–30, 1943, 119 cases of smallpox were reported in Indochina, including 8 cases in Annam, 17 cases in Cambodia, 78 cases in Cochinchina, and 16 cases in Tonkin.

Typhus Fever

Algeria.—For the period June 21–30, 1943, 184 cases of typhus fever were reported in Algeria. During the month of April 1943, 28 deaths from typhus fever were reported in Algiers, Algeria.

Bulgaria.—For the period July 8–14, 1943, 42 cases of typhus fever were reported in Bulgaria.

Hungary.—For the week ended July 17, 1943, 10 cases of typhus fever were reported in Hungary.

Iraq.—For the week ended July 3, 1943, 20 cases of typhus fever with 1 death were reported in Iraq.

Rumania.—For the period July 16–23, 1943, 100 cases of typhus fever were reported in Rumania.

Slovakia.—For the week ended July 10, 1943, 9 cases of typhus fever were reported in Slovakia.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

Vol. 58 • AUGUST 20, 1943 • *No. 34*

THE INCIDENCE AND PREVALENCE OF CANCER OF THE LUNG[1]

By HAROLD F. DORN, *Senior Economist, United States Public Health Service*

The increasing frequency with which cancer of the lung has been reported as a cause of death in recent years has aroused considerable speculation as to whether the increase represents a real change in the incidence of this form of malignant neoplasm or is merely the result of improved methods of diagnosis in combination with a more careful search for a disease which has attracted attention because it is reported more frequently than in the past (*1*).

Between 1914 and 1930 the death rate from cancer of the lungs and pleura increased 3.7 times compared with an increase of 20 percent for all forms of cancer combined (*2*). The change among males exceeded that among females, the relative increases being 4.5 and 2.6 times, respectively.

The death rate from cancer of the lungs and pleura continued to increase from 1930 to 1940. The relative change by age groups in the mortality rate for cancer of the lungs and pleura, the respiratory system as a whole, and for all forms of cancer between 1930–31 and 1939–40 among white males and females is shown in figures 1 and 2.

After eliminating the effect of changes in the age composition during the past decade, the death rate from cancer of the lungs and pleura increased 22 percent among white females and 78 percent among white males, or roughly about 2.5 and 8.5 percent per year, respectively. Between 1914 and 1931 the average annual increases were approximately 8 and 10.5 percent, respectively, for females and males, which indicates that the rate of increase in the death rate is becoming smaller.

The mortality rate of other forms of respiratory cancer increased even more than the rate for lungs and pleura. In the white male

[1] From the Division of Public Health Methods, National Institute of Health.

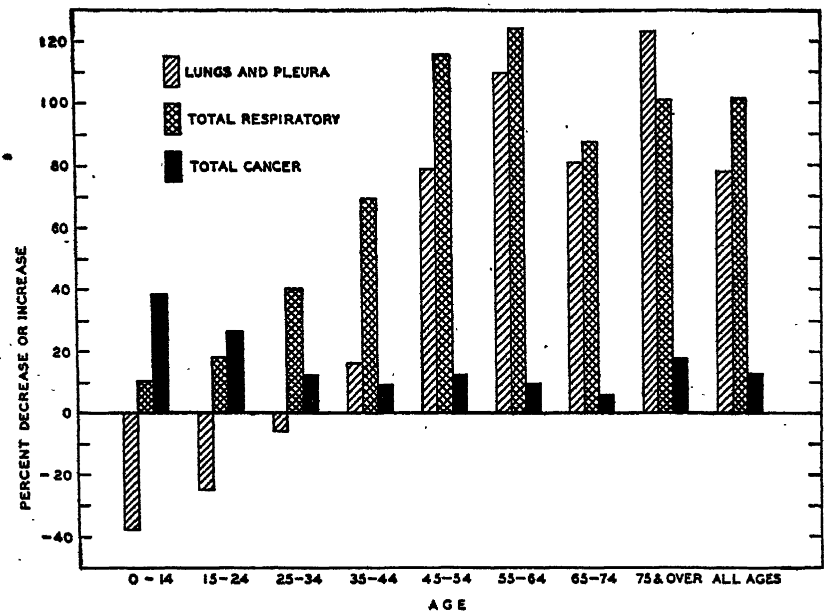

FIGURE 1.—Percentage change in the number of deaths per 100,000 white male population from cancer of the lungs and pleura, cancer of the total respiratory system, and all forms of cancer by age from 1930-31 to 1939-40.

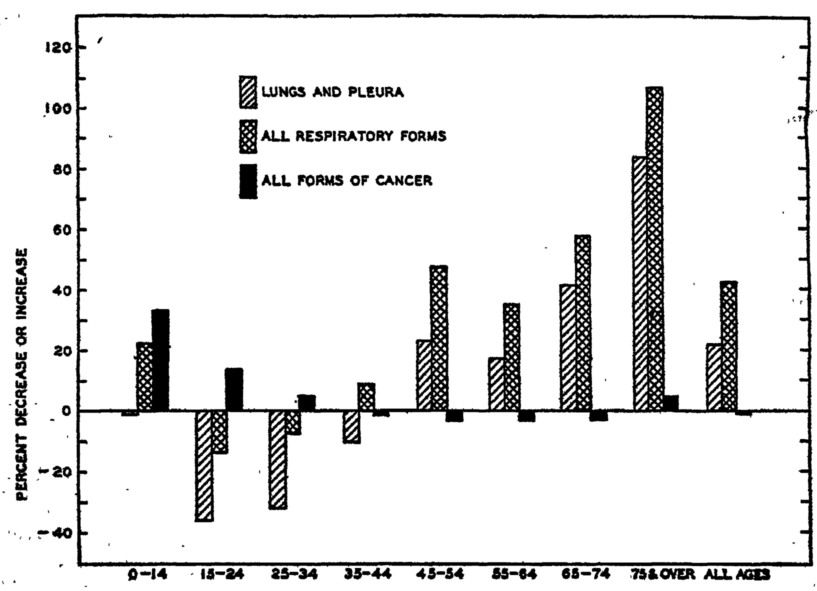

FIGURE 2.—Percentage change in the number of deaths per 100,000 white female population from cancer of the lungs and pleura, cancer of the total respiratory system, and all forms of cancer by age from 1930-31 to 1939-40.

population the rate for total respiratory doubled (an increase of 102 percent); in the white female population the rate increased 42 percent.

The rapid increase in the death rate from cancer of the respiratory system is in striking contrast to the change in the death rate for all forms of cancer. During the past decade the death rate from all forms of cancer among white females actually decreased although the amount of the decrease was negligible (only 1 percent). The corresponding rate among white males increased about 10 percent, but this increase was considerably less than the increase for respiratory cancer, including cancer of the lung.

It can be seen from figures 1 and 2 that the reported increase in the death rate from respiratory cancer is due primarily to an increase in late adult life. During the past decade increases in the death rate from lung cancer were confined to males 35 or more years of age and to females 45 or more years of age. At the younger ages the death rates in 1939–40 were lower than the rates in 1930–31.

Cancer of the respiratory system develops more frequently among males than among females in contrast to all forms of cancer as a whole, which has a higher rate among females (table 1). On the average, the death rate from all forms of cancer is about 9 percent higher for females than for males, but the rate for cancer of the lungs and pleura among males is nearly 2.5 times that among females and for all forms of respiratory cancer the rate among males is more than 3 times the rate among females.

TABLE 1.—*Number of deaths per 100,000 white population from cancer of the respiratory system and from all forms of cancer by sex and age, United States, 1939–40*

Age	Lungs and pleura		Total respiratory		All forms of cancer	
	Male	Female	Male	Female	Male	Female
0–14	0.1	0.1	0.2	0.2	3.8	3.4
15–24	0.3	0.2	0.6	0.3	6.1	4.4
25–34	0.7	0.4	1.2	0.6	12.1	20.7
35–44	3.0	1.3	5.8	1.9	38.4	78.4
45–54	12.4	4.4	22.7	6.1	131.5	197.1
55–64	25.3	9.1	45.1	12.3	350.6	385.7
65–74	28.4	13.3	51.3	18.0	740.6	664.5
75 and over	24.1	12.1	45.9	18.2	327.5	1,110.9
All ages:						
Crude	6.1	2.5	11.1	3.5	117.4	129.5
Standardized [1]	6.2	2.5	11.4	3.6	119.0	129.5

[1] Standardized for age using the total urban population of the United States, 1940.

The available information concerning the number of living persons with cancer is too incomplete to give a reliable estimate of the illness rates. The principal source of data concerning living cases is from admissions to hospitals and more recently from the reports made to a few State departments of health by physicians and hospitals. The

latter are still too incomplete to be used as a basis for estimating illness rates, while the admissions to a particular hospital are so selective that they are unsuitable for the computation of morbidity rates. The use of admission records of a single institution has given rise to many conflicting statements about the incidence of cancer (*3*, *4*).

Because no accurate records of the total number of living persons with a malignant neoplasm were available, the United States Public Health Service in 1938 began to collect such records in a number of urban areas where it was believed that hospital and medical facilities were accessible to all groups of the population. Ten areas were selected for study: Atlanta, Pittsburgh, Detroit, Chicago, New Orleans, Dallas and Fort Worth, San Francisco and Alameda County, Birmingham, Philadelphia, and Denver. In each instance, the county in which the city is located was included and in addition Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Forsythe, and Gwinnett counties were included in the Atlanta area. The population of these areas numbered slightly more than 13 million in 1940 or about 18 percent of the total urban population of the United States.

A complete description of the procedure used in the survey will be found in the reports (listed in reference *5*) which have been issued for each city. For the present purpose it will be sufficient to point out that information concerning each patient seen or treated for a malignant growth during a given calendar year was solicited by means of a questionnaire mailed to every physician and hospital in the study areas. A personal visit was made to physicians and hospitals failing to reply. Reports were obtained from every hospital and from all but about 2 percent of the physicians.

Two types of illness rates will be used; first, the incidence rate or the number of new cases of cancer diagnosed during the course of a year, and, second, the prevalence rate or the number of known cases of cancer at any time during the year. In the discussion which follows cases with cancer of the lung include those diagnosed as having a primary cancer of the lung or bronchiogenic cancer.

Nearly 3 percent of the 39,970 cases in the white population were reported to have a primary cancer of the lung. This is slightly less than the percentage of all deaths from cancer which is attributed to cancer of the lungs and pleura, 3.5 percent.

Age specific prevalence rates of cancer for white males and females are shown in table 2. From these data it is apparent that although the illness rate from all forms of cancer is higher among females than among males, the opposite is true for respiratory cancer. The rate for cancer of the respiratory system is more than 4 times as high among males as among females and the rate for cancer of the lung is more than 3 times as high among males as among females.

TABLE 2.—*Prevalence rates of cancer per 100,000 white population by sex and age for primary cancer of the lung, the respiratory system, and all forms of cancer*

Age	Lung		Total respiratory		All forms of cancer	
	Male	Female	Male	Female	Male	Female
0–14	(1)	0.1	0.3	0.2	10.8	8.7
15–24	0.4	0.3	1.2	0.4	22.1	16.4
25–34	1.4	1.4	2.8	1.8	49.8	96.6
35–44	10.5	1.9	15.3	3.0	138.4	351.9
45–54	34.0	9.8	50.5	11.7	417.8	758.2
55–64	64.8	16.0	104.7	20.4	1,060.7	1,261.8
65–74	64.3	24.1	117.3	29.2	2,075.7	1,792.4
75 and over	53.4	17.8	96.5	23.0	3,011.3	2,268.1
All ages:						
Crude	15.1	4.5	24.5	5.7	302.1	390.9
Standardized [2]	15.9	4.7	26.0	6.0	340.6	411.6
Number of cases	870	259	1,408	328	17,368	22,602

[1] Less than 0.1 per 100,000 population.
[2] Standardized for age using the total urban population of the United States, 1940.

Data collected by the United States Public Health Service.

Out of every 100,000 white males or females at any one time about 410 females and 340 males are under treatment for cancer. Five of the females and 16 of the males are being treated for cancer of the lung.

Although it is not possible to determine the number of new cases of cancer which develop each year, it is possible to determine the number of cases which are diagnosed for the first time during a given year—this number is roughly equivalent to the number of new cases, especially if all or nearly all of the persons with cancer seek medical treatment prior to death.

From table 3 it can be seen that during the course of a year about 250 out of every 100,000 white females and 220 out of every 100,000 white males are diagnosed as having a malignant tumor. Of these, 3 females and 11 males have a primary cancer of the lung. These data clearly indicate that cancer of the lung is a relatively rare primary site of cancer, particularly among females.

A number of experiments with mice have demonstrated that various hydrocarbons will produce malignant tumors (*6*). There is also some epidemiological evidence that air pollution may be a factor in respiratory disease, although this evidence is at best indirect (*7*). If it were true that soot and other flue products resulting from the burning of coal, when continuously present in the atmosphere, increased the incidence of lung tumors in the population, it should be possible to detect this fact by collecting information concerning the number of persons with respiratory cancer in cities with varying degees of atmospheric pollution. Table 4 presents incidence rates for malignant tumors of the lung and the entire respiratory system for a number of cities included in the survey.

TABLE 3.—*Number of new cases of cancer per 100,000 white population per annum by sex and age for primary cancer of the lung, the respiratory system, and all forms of cancer*

Age	Lung		Total respiratory		All forms of cancer	
	Male	Female	Male	Female	Male	Female
0-14	(1)	0.1	0.3	0.2	7.9	6.4
15-24	0.2	0.1	0.9	0.1	14.5	12.0
25-34	1.2	0.6	2.3	0.9	35.1	101.1
35-44	7.0	1.0	10.8	1.7	92.9	224.1
45-54	24.0	5.8	35.1	7.0	285.6	461.9
55-64	42.4	11.7	69.2	14.4	705.2	747.9
65-74	44.0	13.6	77.3	17.0	1,299.4	1,039.8
75 and over	36.6	9.7	56.2	13.5	1,757.9	1,185.0
All ages:						
Crude	10.3	2.7	16.6	3.5	196.1	234.4
Standardized [2]	10.8	2.9	17.5	3.7	219.2	252.0
Number of cases	592	157	952	200	11,273	13,554

[1] Less than 0.1 per 100,000 population.
[2] Standardized for age using the total urban population of the United States, 1940.

Data collected by the United States Public Health Service.

Although exact measures of the air pollution are not available, it is generally thought that, of the cities listed in table 4, the greatest amount of pollution is in Pittsburgh. However, the incidence rate for lung and respiratory cancer in males is lower in Pittsburgh than in any of the other cities except Denver. There is less difference in the rates for females; in fact these data indicate that there is no real difference in the rates of the surveyed cities.

TABLE 4.—*Number of new cases of cancer per 100,000 white population per year with primary location in the lungs and the respiratory system by sex for selected cities* [1]

City	Lung		Total respiratory	
	Male	Female	Male	Female
Philadelphia	14.8	3.1	25.1	4.4
Alameda and San Francisco	11.5	3.1	19.1	4.3
Chicago	10.2	3.0	18.1	4.0
Detroit	11.1	2.4	15.9	3.3
Pittsburgh	8.7	2.9	14.9	4.0
Denver	7.4	4.0	12.4	5.3

[1] Standardized for age using the total urban population of the United States, 1940.

Data collected by the United States Public Health Service.

The highest rate for males was reported from Philadelphia. It is possible that the rate for Philadelphia is somewhat too high because of the Chevalier Jackson Clinic in that city. The rates in table 4 are based upon resident cases only, but it is possible that some patients staying with friends or relatives in Philadelphia may have been reported as residents. So far as is known this did not occur.

These data do not necessarily prove that atmospheric pollution has no effect upon the incidence of respiratory cancer. On the other hand they offer no affirmative evidence that such is the case. The causes of respiratory cancer are probably too complicated to be discovered in this relatively crude manner.

The figures in tables 2 and 3 may be used to estimate the number of persons with cancer of the lung in the whole country by multiplying them by the age distribution of the population of the United States in 1940. The data on which these rates are based were collected in urban areas so that it might be thought the rates are too high to use as a national average since the death rate from cancer is higher in urban than in rural communities. On the other hand, the rates are somewhat too low because a number of persons with cancer fail to obtain medical treatment prior to death. These two factors counterbalance each other to a certain extent so that estimates for the entire country may not be seriously in error.

It is estimated that between 450,000 and 500,000 persons in the United States are under medical treatment for cancer. In addition there is an unknown number of persons with undiagnosed cancer as well as those who have been treated for cancer and are now "cured." Approximately 20,000 of the known cases under treatment have a primary cancer of the respiratory system; of these about 13,000 are being treated for primary cancer of the lung.

Slightly more than 8,000 new cases of primary cancer of the lung are diagnosed and receive medical treatment for the first time each year. Nearly 5,000 additional cases with primary cancer of other parts of the respiratory system are also diagnosed, making a total of approximately 13,000 new cases of primary cancer of the respiratory system which are given medical care for the first time each year.

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CARBARSONE TREATMENT FOR *BALANTIDIUM COLI* INFECTIONS[1]

By Martin D. Young, *Parasitologist, United States Public Health Service*, and Robert Burrows, *Parasitologist, South Carolina State Hospital*

In 1939, seven infections of *Balantidium coli* were reported at the South Carolina State Hospital (*1*). Up until that time there was not a universally accepted treatment for this infection. These seven infections were treated with carbarsone; this report presents the results of the treatment.

Table 1.—*Dosages of carbarsone and results of treatment in seven infections of Balantidium coli*

Patient	Number of doses	Dose in grams	Daily dosage (grams)	Post-treatment observations		
				Length in months	Number of examinations	Number positive
D. H.	20	0.25	0.5	48	3	0
J. T.	20	.25	.5	40	16	0
S. H.:						
First course	20	.25	.5	1	2	2
Second course[1]	20	.25	.5	1.5	3	0
H. K.:						
First course	20	.25	.5	[3]6	15	4
Second course	20	.25	.5	[3]40	12	0
E. A.[1,2]	15	.1-.24	.1-.24	4	7	0
J. W.	20	.50	1.0	48	13	0
A. L.	20	.50	1.0	25	11	0

[1] Died of causes unrelated to balantidiasis.
[2] Irregular treatment. Total of 2.2 gm. given in 15 doses over a 22-day period.
[3] Approximately.

Carbarsone in the amount of 0.25 gm. per dose, two doses per day given for 10 days, eradicated the infections in two (D. H. and J. T.) of the four patients so treated. In the two failures (S. H. and H. K.) the course was repeated and was successful. In one case (E. A.) receiving the drug in smaller amounts the infection disappeared. In the other two cases (J. W. and A. L.) a course of 1.0 gm. per day (two doses of 0.5 gm. each) for 10 days eradicated the infection.

Post-treatment examinations were made repeatedly for periods extending from 1 month up to 4 years. The absence of balantidia during the follow-up periods indicated a cure.

These seven infections, as far as can be ascertained by the authors, appear to be the largest group treated as yet in this country.

SUMMARY AND CONCLUSIONS

Carbarsone, in courses totaling either 5 or 10 gm. in a 10-day period, was given to six cases of balantidiasis. After one or two such courses of treatment, the infections were eradicated as shown by repeated post-treatment examinations some of which extended over a 4-year period.

[1] From the Division of Infectious Diseases, National Institute of Health.

A seventh infection, which received less carbarsone than the other six, also disappeared.

Carbarsone appears to be an effective drug in the treatment of *Balantidium coli* infections.

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SICKNESS ABSENTEEISM AMONG INDUSTRIAL WORKERS, FIRST QUARTER OF 1943, WITH AN INQUIRY INTO THE OCCURRENCE OF THE RESPIRATORY DISEASES, 1934–43 [1]

By W. M. Gafafer, *Senior Statistician, United States Public Health Service*

The accompanying data on the frequency of 8-day or longer absences on account of sickness and nonindustrial injuries are derived from analyses of periodic reports from industrial sick benefit associations, group insurance plans, and company relief departments.

First quarter of 1943.—Table 1 shows by cause the average annual number of absences per 1,000 workers for the first quarter of 1943 with the corresponding rates for 1942 and 1941, respectively. A comparison of 1943 with 1942 reveals a 32-percent increase in the rate for sickness and nonindustrial injuries, and a 68-percent increase for the respiratory group of diseases.

An examination of the rates for the 10 first quarters of 1934–43 shows the 1943 rate for sickness and nonindustrial injuries to be the highest, and 31 percent in excess of the 10-year mean of 124.2. Likewise the respiratory rate for the first quarter of 1943 has never been equalled or exceeded during the same 10-year period, the rate of 96.8 exceeding the 10-year mean of 63.5 by 52 percent.

Interest in the table thus centers around the respiratory diseases. Attention is directed to the pneumonia rate of 16 which is more than twice the corresponding rate for the preceding year. Moreover a comparison of the first quarters of 1943 and 1942 reveals a 78-percent excess for bronchitis, a 68-percent excess for diseases of the pharynx and tonsils, and a 67-percent excess for influenza and grippe. These observations raise the question of the changes with time of the contribution of each of these four causes to the total respiratory disease rate.

Respiratory causes, first quarters, 1934–43.—Figure 1 presents graphically the variation over the 10-year period 1934–43 of the contribution of each of four respiratory causes to the varying total respiratory

[1] From the Division of Industrial Hygiene, National Institute of Health. The last report of this series appeared in Public Health Reports, 58: 1250–1254 (Aug. 13, 1943.)

TABLE 1.—*Average annual number of absences on account of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer among* MALE *employees in various industries, by cause, the first quarter of 1943 compared with the first quarters of 1942 and 1941* [1]

Cause (Numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of absences per 1,000 males for the first quarter		
	1943	1942	1941
Sickness and nonindustrial injuries [2]	162.9	123.4	139.7
Nonindustrial injuries (169–195)	12.7	12.2	11.6
Sickness	150.2	111.2	128.1
Respiratory diseases	96.8	57.6	79.7
Tuberculosis of the respiratory system (13)	.5	.7	.5
Influenza, grippe (33)	40.8	24.4	51.1
Bronchitis, acute and chronic (106)	16.4	9.2	7.9
Pneumonia, all forms (107–109)	16.0	7.3	5.9
Diseases of the pharynx and tonsils (115b, 115c)	9.9	5.9	5.6
Other respiratory diseases (104, 105, 110–114)	13.2	10.1	8.7
Digestive diseases	14.2	16.0	14.5
Diseases of the stomach except cancer (117, 118)	4.5	4.4	3.9
Diarrhea and enteritis (120)	1.6	1.5	1.2
Appendicitis (121)	3.7	5.3	5.0
Hernia (122a)	1.9	1.7	1.6
Other digestive diseases (115a, 115d, 116, 122b–129)	2.5	3.1	2.8
Nonrespiratory-nondigestive diseases	35.5	35.4	30.8
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44) [3]	2.6	3.2	2.4
Rheumatism, acute and chronic (58, 59)	4.4	4.0	4.7
Neurasthenia and the like (part of 84d)	1.2	1.0	.8
Neuralgia, neuritis, and sciatica (87b)	2.9	2.3	2.1
Other diseases of the nervous system (80–85, 87, except part of 84d, and 87b)	1.4	1.2	1.2
Diseases of the heart and arteries, and nephritis (90–99, 102, 130–132)	5.0	5.1	4.7
Other diseases of the genitourinary system (133–138)	2.4	2.4	2.1
Diseases of the skin (151–153)	2.7	2.3	2.3
Diseases of the organs of movement except diseases of the joints (156b)	3.6	3.4	3.0
All other diseases (45–57, 60–79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	9.3	10.5	7.5
Ill-defined and unknown causes (200)	3.7	2.2	3.1
Average number of males covered in the record	2[illegible]5,711	251,889	218,021
Number of organizations	21	21	22

[1] The same 21 organizations are included in 1943 and 1942.
[2] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not reported.
[3] Except influenza, respiratory tuberculosis, and the venereal diseases.

disease rate. With regard to the movement of the total respiratory disease rate, it will be observed that the highest rate is yielded by 1943. Of interest also are the minimum rates displayed by the years 1934, 1938, and 1942, each of the first two rates introducing what appears to be a 4-year cycle. Noteworthy is the fact that each of the three minimum rates is higher than its predecessor.

The movement of the rates for influenza and grippe is the principal determining factor of the variation of the total respiratory rate. Each of the remaining three causes shown in figure 1 yields for 1943 the maximum frequency. Perhaps of most interest, and common to each of the four causes, is the abrupt increase in frequency from 1942 to 1943.

Frequency and duration of absences on account of respiratory diseases, 1943 and 1942.—The unusually high rates yielded for the first quarter of 1943 by the group of respiratory diseases and by certain of the specific respiratory causes rouse interest in the behavior of these rates

with respect to absence-duration. Since the frequency of all respiratory diseases based on 8-day or longer absences reported by the 21 cooperating companies was 68 percent in excess of the corresponding rate for 1942, can it be assumed that there was a similar excess in the frequency of absences of, say, 14 days or longer, or 21 days or longer?

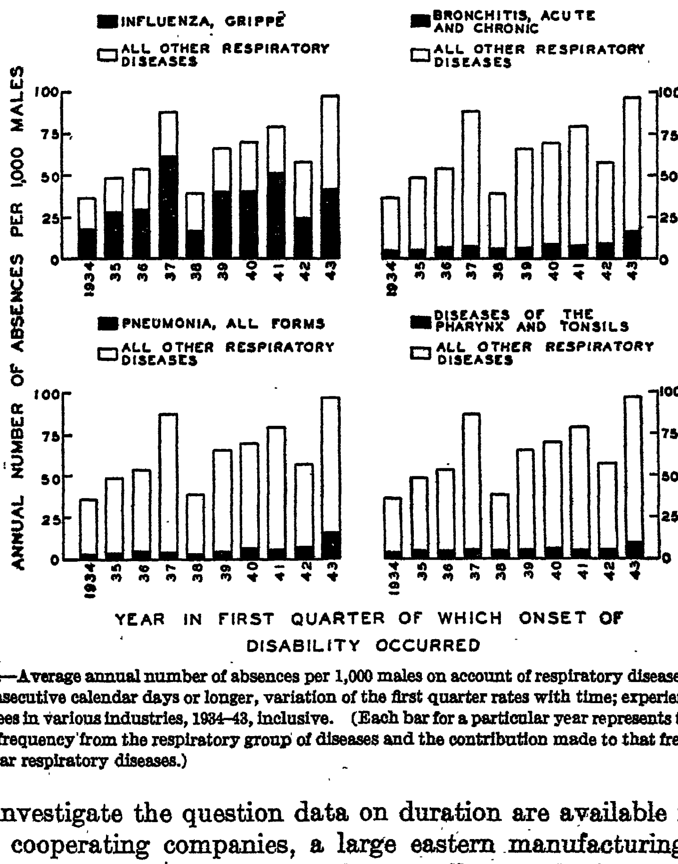

FIGURE 1.—Average annual number of absences per 1,000 males on account of respiratory diseases disabling for 8 consecutive calendar days or longer, variation of the first quarter rates with time; experience of male employees in various industries, 1934–43, inclusive. (Each bar for a particular year represents the average annual frequency from the respiratory group of diseases and the contribution made to that frequency by particular respiratory diseases.)

To investigate the question data on duration are available for one of the cooperating companies, a large eastern manufacturing plant with over 12,000 male workers and an excellent medical department. These data were used to determine the average annual number of absences per 1,000 males on account of respiratory diseases disabling for *t* days or longer, and beginning during the first quarters of 1943 and 1942, respectively. Sufficient data are available to allow *t* to assume values from 8 to 21 days. In general as *t* becomes larger the number of absences must become smaller. Should there be a relatively large number of long durations, the frequency rate would decrease rather slowly with increasing values of *t*; on the other hand a relatively large number of short absences would be indicated by a rate decreasing more rapidly. Thus a comparison of such rates for the 2 years would

be useful in showing possible differences in the two experiences with respect to duration of absence.

Accordingly the ratios of the frequencies for the group of respiratory diseases and five specific respiratory causes for 1943 to the corresponding rates for 1942 were examined for durations from 8 days or longer to 21 days or longer. Ratios showing an increasing trend for a particular cause would indicate a relatively greater number of longer absences in 1943 than in 1942, while ratios showing a decreasing trend would reveal a relatively greater number of shorter absences in 1943.

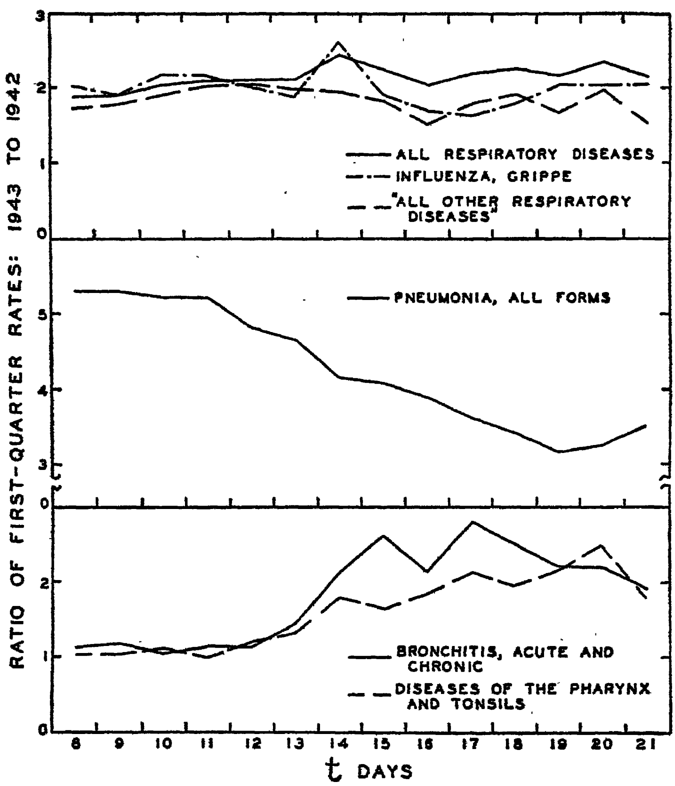

FIGURE 2.—Ratio of the average annual number of absences per 1,000 males on account of respiratory diseases disabling for a specified number of calendar days, *t* or more, during the first quarter of 1943 to the corresponding rate for 1942; experience of male employees of an eastern manufacturing company.

Ratios with an approximately level trend would indicate that no great difference existed in the relative distribution of 8 to 21-day or longer absences for the 2 years.

The ratios are presented graphically in figure 2. An examination of the figure reveals that all three types of trends are present. The ratios for the group of all respiratory diseases, influenza and grippe, and "all other respiratory diseases," respectively, exhibit approxi-

mately level trends, the rates for 1943 for each of these disease classifications being about twice the corresponding rates for 1942. Thus for these three classifications, and within the chosen duration limits, little difference is shown in the two experiences with respect to duration of absence.

The ratios for pneumonia show a decreasing trend, indicating a relatively greater number of shorter absences in 1943; however, each of these ratios is greater than 3, the frequency of absences of 21 days or longer being 3.5 times the corresponding rate for 1942. The ratios for bronchitis and diseases of the pharynx and tonsils, respectively, tend to increase; the frequency of 8-day or longer absences for each cause is only slightly higher in the first quarter of 1943 than in the corresponding quarter of 1942, but the frequency of 14-day or longer absences and 21-day or longer absences is approximately twice the corresponding rate for 1942.

Thus in the comparison of the first quarters of 1943 and 1942 this particular company yields for pneumonia, bronchitis, and diseases of the pharynx and tonsils an excess of 8-day or longer absences which is not uniformly distributed with respect to the selected absence-durations.

THE MECHANISM OF ANTITOXIC IMMUNITY IN *CLOSTRIDIUM PERFRINGENS* (WELCHII) INFECTIONS IN GUINEA PIGS [1]

By Sarah E. Stewart, *Bacteriologist, United States Public Health Service*

It has been shown that it is possible to immunize guinea pigs with perfringens toxoid so that the guinea pigs are resistant to many lethal doses of toxin or to viable culture injected either intraperitoneally or intramuscularly (*1*). Recently (*2*) a comparative study was made on the amount of protection afforded by immunized guinea pigs having definite antitoxin levels against viable culture and against toxin. It was found that guinea pigs immunized with toxoid alone were more resistant to massive doses of whole culture than to equivalent doses in M. L. D.'s of toxin. In the present study it is shown that the greater resistance of immunized guinea pigs to viable bacteria as compared to toxin is due to the active part taken by phagocytic cells, in the presence of antitoxin, in removing the bacteria.

METHODS

Guinea pigs were immunized with concentrated perfringens toxoid produced from 12-hour culture filtrates, using the procedure described earlier (*1*).

[1] From the Division of Biologics Control, National Institute of Health.

Clostridium perfringens, strain WX obtained from Dr. G. B. Reed, Queen's University, Kingston, Ontario, was used as the challenge organism. This strain was chosen because of its high virulence and its rapidly invasive properties. For a 300 to 400 gm. guinea pig the M. L. D. of an 18-hour meat culture was found to be 5×10^{-6} to 5×10^{-7} cc. when injected intramuscularly using the technique described by Reed and Orr (*3*). The intraperitoneal dose for guinea pigs of the same size was found to be much larger, being between 0.05 and 0.1 cc. of undiluted culture. For the intraperitoneal injections the tissue was not traumatized.

In the preliminary work two immunized guinea pigs, Nos. 43 and 6, having 0.25 to 0.5 and 0.5 to 1.0 unit of circulating antitoxin per cc. of serum, respectively, were each inoculated intraperitoneally with 0.1 cc. of an 18-hour culture. Two control guinea pigs, Nos. 292 and 293, were inoculated in the same manner. The guinea pigs were inoculated at 9 a. m., then 6 hours and 20 hours later fluid for examination was removed by puncture from the peritoneal cavity. Puncture was made with a sterile 20-gage needle and fluid that rose into the needle was withdrawn with a sterile Pasteur pipette. Stained preparations were then made from air-dried films and these were examined microscopically.

OBSERVATIONS

The 6-hour films made from the immunized guinea pigs showed a great increase in leucocytes, especially polymorphonuclear cells, and these were very actively phagocytic. In guinea pig No. 6 no free bacteria were observed and many polymorphonuclear cells were found which contained masses of phagocytosed bacilli. In No. 43, which had a lower antitoxin level, free bacteria were observed but marked phagocytosis was also present. No. 6 at no time showed any signs of a toxemia or of an infection, while No. 43 developed a small local infection in the subcutaneous tissue at the site of the injection. This cleared in a few days. The 20-hour films from No. 43 showed very few free bacteria.

In the control guinea pigs, although there was an increase in leucocytes as observed in the 6-hour films, very little phagocytosis was found and there were a great number of free bacteria. The number of free bacteria increased and the phagocytic cells decreased as the guinea pigs became more ill. One guinea pig died in 12 hours and the other in 26 hours. The 6- and 20-hour films of immune guinea pig No. 6 and of non-immune guinea pig No. 292 are shown in Plate I.

A series of eight other toxoid immunized guinea pigs having from 0.25 to 6.0 units of antitoxin per cc. of serum were checked for immunity in a similar manner, making the challenge culture injections

FIGURE 1.—Six-hour slide from immune guinea pig No. 6.

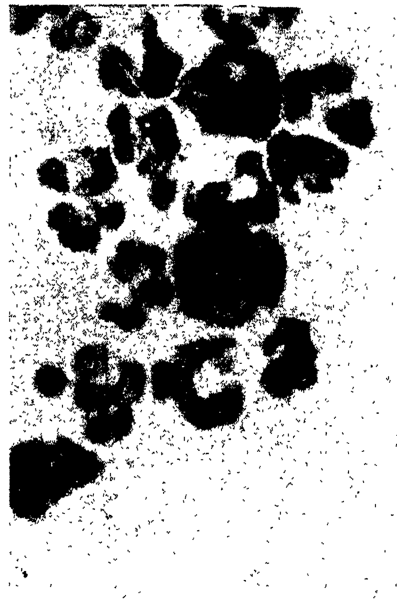

FIGURE 2.—Twenty-hour slide from immune guinea pig No. 6.

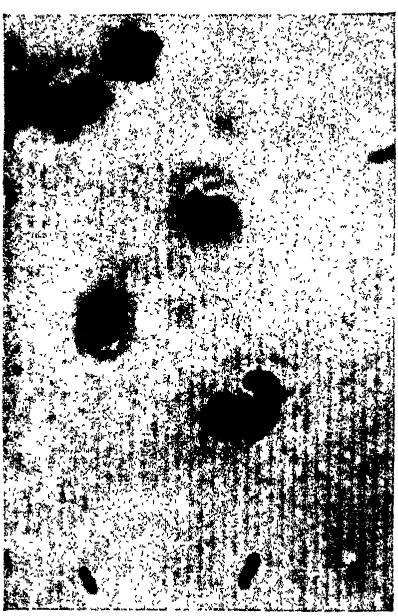

FIGURE 3.—Six-hour slide from non-immune guinea pig No. 292.

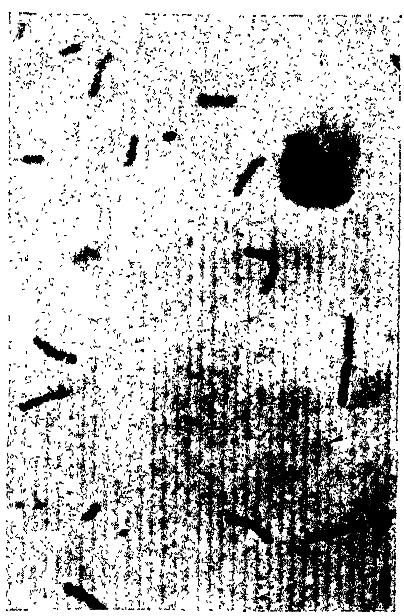

FIGURE 4.—Twenty-hour slide from non-immune guinea pig No. 292.

(Wright's stain. × 1350.)

FIGURE 5.—Four-hour slide from immune guinea pig inoculated with 0.1 cc. 18-hour culture *Cl. perfringens* plus 0.3 MLD perfringens toxin.

FIGURE 6.—Four-hour slide from non-immune guinea pig inoculated with 0.1 cc. 18-hour culture *Cl. perfringens* plus 0.3 MLD perfringens toxin.

(Wright's stain. × 1350.)

either intraperitoneally or subcutaneously. Punctures were made at hour intervals up to the twelfth hour. Differences could be observed between the immune and non-immune as evidenced by phagocytosis as early as two hours after inoculation. In every instance guinea pigs with circulating antitoxin all showed a high degree of phagocytosis with few if any free bacteria. When free bacteria were present they were found to decrease with time until all had been removed as evidenced by peritoneal or subcutaneous puncture. All immunized guinea pigs, even those with as little as 0.25 unit of antitoxin, remained free of infection.

In a similar series of control guinea pigs all died in from 6 to 36 hours. In the controls if the culture had little free toxin, phagocytic activity was quite marked within the first 6 hours. However, as time passed, this was found to decrease with a corresponding increase in the number of free bacteria. Prior to death of the animals phagocytic cells were very few and the number of bacteria in the peritoneal cavity and other tissues was enormous.

Effect of adding toxin to the culture.—Culture WX, although highly virulent and very invasive as shown by intramuscular injections, was found to be only a fair toxin producer in comparison with strains PB6H and SR12 which are generally used for toxin production. For this reason a series of experiments were tried where a small amount of perfringens toxin was added to the culture prior to injection. When 0.25 to 0.5 M.L.D. of toxin was added to 0.1 cc. of culture, control guinea pigs were found to die within 4 to 6 hours, as compared to 6 to 36 hours for culture alone. Films from the peritoneal fluid 3 and 6 hours after inoculating, made while the guinea pig showed much toxemia, had masses of free bacteria with few phagocytic cells and no phagocytosis. In immunized guinea pigs the added toxin had little effect on phagocytic activity; it was retarded to some extent but as the toxin became neutralized phagocytosis increased and the guinea pigs remained normal. Four-hour films from immune and control guinea pigs having received both toxin and culture intraperitoneally are shown in plate II.

Kropp and Smith (*4*) in studying the effect of sulfanilamide on gas gangrene infection also found that perfringens toxin inhibited phagocytosis and that it brought about a destruction of the phagocytic cells. Sulfanilamide, however, was not found to increase phagocytic activity but to a very slight degree.

Passive immunization.—Guinea pigs passively immunized by intraperitoneal inoculation of perfringens antitoxin showed the same immune reactions as evidenced by phagocytosis as did the actively immunized guinea pigs. This indicates that the phagocytic activity is not due to any inherent factor in the phagocytic cells of immune

animals but due only to the neutralization of the toxin produced by the bacilli.

Effect of benzene on the immune reaction.—To demonstrate further that the adequacy of antitoxic immunity in infections due to *Cl. perfringens* is dependent on the efficient functioning of a complex system of phagocytic cells, guinea pigs treated with benzene in order to induce a leukopenia were checked for their resistance to perfringens infection.

Two toxoid immunized guinea pigs, Nos. 20 and 23, having 6 units and 3.0 to 4.0 units of circulating antitoxin, respectively, per cc. of serum and two control guinea pigs were each given daily intraperitoneal injections of 0.25 cc. of benzene for 5 consecutive days. Each guinea pig was then injected intraperitoneally with 0.1 cc. of an 18-hour culture of WX. Films were made from the peritoneal fluid 4 and 6 hours after the culture injections. All guinea pigs showed a decided leukopenia and the immunized as well as the controls had masses of free perfringens bacilli and only an occasional polymorphonuclear leucocyte. From the films no differences could be observed in the immunized and control guinea pigs.

The circulating antitoxin of immunized guinea pigs which, together with phagocytic cells, had been found so efficient in combating infection with *Cl. perfringens* was ineffective in preventing the growth of *Cl. perfringens* in the absence of leucocytes. All four animals died within 24 hours after the culture inoculation; the controls showed macroscopic lesions characteristic of perfringens infection while the immunized guinea pigs, although they showed no lesions, had masses of free living bacilli in the peritoneal cavity.

In a later series of guinea pigs treated with benzol a variation was observed in the degree of leucopenia produced. If polymorphonuclear cells were not greatly decreased, those present in the immunized guinea pigs were still capable of phagocytic activity.

CONCLUSIONS

It has been shown that in guinea pigs a purely antitoxic immunity affords effective protection against infection with an invasive toxicogenic strain of *Cl. perfringens*. This protection is made possible by the action of the antitoxin which renders the toxicogenic bacteria nontoxic and susceptible to the action of phagocytic cells.

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(3) Reed, G. B., and Orr, J. H.: Local chemotherapy of experimental gas gangrene. War Medicine, 2: 59 (1942).
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HEALTH OF THE UNITED STATES AT WAR

Morbidity and mortality reports indicate that the health of the people of the United States has not as yet been significantly affected by conditions incident to our participation in the present World War. It has now been more than a year and a half since the United States entered the conflict. During the first year of our participation, 1942, the death rate for the United States was the lowest ever recorded (10.4 per 1,000 population), and only one important communicable disease—meningococcus meningitis—assumed epidemic proportions. Typhoid fever and smallpox established new low records during the year. It is of especial interest to note that there has been no indication of increased mortality from respiratory tuberculosis in this country since the beginning of the war, such as occurred in Great Britain and some continental countries. In fact the death rate from this cause has been lower than in 1939 and 1940.

The high health level of 1942 has been maintained during the first half of 1943. With the exception of meningococcus meningitis, poliomyelitis, and the dysenteries, the incidence of the communicable diseases reported to the Public Health Service during the first half, even the first 7 months, of 1943 is below or approximately the same as that for the corresponding period of 1942. Meningococcus meningitis, the incidence of which began to increase during the spring of 1942 and developed into an incipient epidemic toward the end of the year, rose sharply early in 1943 and assumed epidemic proportions during the first half year, remaining at a rather high level during July. Up to the week ended July 31, a total of 12,982 cases had been reported in 1943. This is a larger number of cases than has been reported to the Public Health Service for any entire year since 1914, when the collection of morbidity reports by the Service was begun. The largest number of cases for any year during that period was 10,551, reported in 1929.

While poliomyelitis has followed the curve of seasonal expectancy, recording a rise during the early summer of this year, the incidence has exceeded the normal expectancy and, up to the latter part of July, was above that for any other year since 1934. As is usually the case, the above-normal incidence recorded for the country as a whole is due to the occurrence of the disease in epidemic proportions in a few States, to date this year in California, Texas, Oklahoma, and Kansas.

There has been an increased incidence of the dysenteries during the first half of 1943. About 60 percent more cases were reported up to the end of July than were reported for the same period last year. This increase is probably due, at least in large measure, to the lack of adequate sanitary precautions in food establishments and carelessness among food handlers.

Preliminary figures indicate that a new low record will be established in 1943 for typhoid morbidity and mortality and possibly for smallpox. Up to July 31, a total of 2,661 cases of typhoid fever had been reported in the United States, as compared with 3,390 for the same period last year.

The provisional mortality figures for the first six months of 1934 are slightly less favorable than for the same period last year. The provisional death rate for the first half of 1943 is 11.0 per 1,000 estimated population, or only 3.8 percent higher than the rate of 10.6 for the comparable period last year. Although higher than the rate for the first six months of last year, it is lower than that for any year prior to 1938.

The increase in mortality appears to be much more marked in large cities than in the country as a whole. According to provisional reports from 88 major cities, the number of deaths in the first half of 1943 was 10.8 percent higher than that reported for the same period of 1942. It is possible that some of this increase is due to the greater use of hospital facilities in the large cities in 1943 by residents of areas adjacent thereto. Also, there has probably been some in-migration to these cities, which would tend to increase the number of deaths without an actual corresponding increase in the death rate.

There are probably several causes contributory to the increased death rate this year as compared with that for last year. There are indications that, because of the increase in the virus pneumonias, which are not amenable to treatment by the sulfa drugs, the mortality from pneumonia has increased. The preliminary returns from mortality sampling indicate that while there has also been some slight excess mortality from some of the diseases of childhood and from meningococcus meningitis, the increased mortality from the cardiovascular-renal diseases, small in percentage change though comparatively large numerically, is chiefly responsible for keeping the general death rate somewhat high.

The home health front has been defended. Emergency conditions and the various restrictions which have been imposed upon the American people as the result of war have not as yet seriously affected the public health. However, this good record is no occasion to relax the safeguards. It is, rather, a challenge to all health workers to maintain it in the future. And to do so will undoubtedly require even greater effort in view of the possibilities of epidemics, effects of fatigue in industries running in high gear, malnutrition as the result of lack of the application of knowledge regarding adequate food substitutes, the introduction of tropical diseases by returning troops, the depletion of medical and nursing services for the civilian population, and numerous other factors in our social life which adversely affect the health of the people.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 14, 1943

Summary

A total of 546 cases of poliomyelitis was reported for the current week, as compared with 450 for the preceding week and a 5-year (1938–42) median of 261. States reporting the largest numbers, aggregating 417 cases, or 76 percent of the total, are as follows (last week's figures in parentheses): California, 94 (111); Kansas, 89 (43); Illinois, 70 (34); Texas, 67 (62); Oklahoma, 40 (52); New York, 30 (18); Connecticut, 27 (24). Increases occurred in 19 other States, but no other State reported more than 13 cases. The cumulative total reported for the first 32 weeks of the year is 3,312, as compared with 1,322 for the same period last year and a 5-year median of 1,681. The peak week of incidence of poliomyelitis occurred by the second week of September in each of the past 8 years except in 1936, when it was not reached until the first week of October.

A total of 185 cases of meningococcus meningitis was reported, as compared with 201 last week and 33 for the 5-year median. The largest numbers reported were 21 in New York and 19 in California. No other State reported more than 12 cases. The cumulative total for the first 32 weeks of the year is 13,368, as compared with 2,354 for the same period last year and a 5-year median of 1,392. The lowest weekly median of the past 5 years was 25 cases, recorded for the week ended August 27, 1938, and the least number for any week of that period was 15 for the week ended September 2, 1939.

The incidence of influenza, measles, scarlet fever, and whooping cough is currently above the corresponding 5-year medians, while that of diphtheria, smallpox, and typhoid fever is below; but, of these diseases, the cumulative total for the first 32 weeks of the year for only one—measles—is above the comparable median.

Deaths recorded for the week in 86 large cities of the United States aggregated 7,063, as compared with 7,304 for the preceding week and a 3-year (1940–42) average of 6,450. The cumulative total for the first 32 weeks of the year is 268,368, as compared with 243,950 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended August 14, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42
	Aug. 14, 1943	Aug. 15, 1942		Aug. 14, 1943	Aug. 15, 1942		Aug. 14, 1943	Aug. 15, 1942		Aug. 14, 1943	Aug. 15, 1942	
NEW ENGLAND												
Maine	1	0	0	------	------	------	28	12	12	0	1	0
New Hampshire	0	0	0	------	------	------	0	0	1	0	0	0
Vermont	0	0	0	------	------	------	19	32	10	2	0	0
Massachusetts	3	3	3	------	------	------	121	70	83	11	3	0
Rhode Island	0	0	0	------	------	------	12	4	4	4	0	0
Connecticut	0	0	0	2	1	------	26	9	9	5	1	1
MIDDLE ATLANTIC												
New York	2	7	9	------	[1] 1	[1] 1	310	101	202	21	9	8
New Jersey	1	1	1	3	5	2	153	42	42	12	6	1
Pennsylvania	5	2	10	------	------	------	47	32	118	12	2	2
EAST NORTH CENTRAL												
Ohio	5	0	3	2	4	4	87	32	32	6	1	1
Indiana	7	5	5	------	4	2	23	6	6	9	0	0
Illinois	6	13	13	2	2	2	53	16	30	11	1	0
Michigan [2]	2	1	5	1	1	------	96	48	88	3	2	0
Wisconsin	2	0	0	7	7	7	240	103	134	4	0	0
WEST NORTH CENTRAL												
Minnesota	0	0	1	1	------	------	39	9	11	2	0	0
Iowa	4	0	2	------	------	------	5	11	21	1	0	0
Missouri	1	3	1	------	1	1	16	3	3	5	0	0
North Dakota	0	0	3	------	3	------	23	6	5	0	0	0
South Dakota	2	1	1	------	------	------	9	2	2	0	0	0
Nebraska	2	0	0	2	2	------	3	16	1	0	0	0
Kansas	3	1	3	------	------	------	10	4	7	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	2	0	0	2	0	0
Maryland [2]	1	2	3	1	------	------	30	5	6	2	1	1
District of Columbia	0	0	1	------	------	------	7	1	3	3	0	0
Virginia	3	10	10	26	37	37	20	7	33	8	2	1
West Virginia	2	5	5	------	2	4	6	1	3	0	0	0
North Carolina	9	10	15	------	------	------	29	45	45	7	1	1
South Carolina	7	13	11	101	98	110	11	6	7	1	0	1
Georgia	7	9	15	24	21	5	10	5	6	2	1	0
Florida	2	2	2	5	1	1	1	8	4	10	0	0
EAST SOUTH CENTRAL												
Kentucky	1	3	3	------	------	1	4	0	4	0	0	1
Tennessee	5	1	4	5	4	6	27	9	9	0	0	2
Alabama	11	7	11	9	17	16	20	0	4	0	3	2
Mississippi [2]	3	5	5	------	------	------	------	0	------	4	0	1
WEST SOUTH CENTRAL												
Arkansas	3	7	7	1	14	14	21	4	4	0	1	0
Louisiana	8	2	2	1	4	4	4	7	4	0	4	1
Oklahoma	1	3	3	2	6	10	10	2	2	4	0	0
Texas	22	21	21	201	74	96	50	41	41	4	1	2
MOUNTAIN												
Montana	2	2	0	------	------	------	36	3	8	0	0	0
Idaho	0	0	0	------	------	------	3	3	1	0	0	0
Wyoming	2	0	1	1	5	------	5	7	5	1	1	0
Colorado	3	3	6	16	9	6	23	3	8	2	0	0
New Mexico	1	1	0	------	------	------	0	4	5	1	0	0
Arizona	3	1	1	40	25	18	16	10	9	1	0	0
Utah [2]	0	0	0	------	------	------	12	46	12	0	0	0
Nevada	0	0	------	------	------	------	13	2	------	0	0	------
PACIFIC												
Washington	10	1	1	------	2	------	21	80	12	3	1	0
Oregon	0	2	1	4	3	3	20	30	19	3	1	1
California	13	10	10	26	13	13	126	133	113	19	4	2
Total	165	157	176	483	366	366	1,852	1,020	1,371	185	47	33
32 weeks	7,053	7,241	8,688	81,161	80,391	151,299	535,598	465,780	465,780	13,368	2,354	1,392

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 14, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Aug. 14, 1943	Aug. 15, 1942		Aug. 14, 1943	Aug. 15, 1942		Aug. 14, 1943	Aug. 15, 1942		Aug. 14, 1943	Aug. 15, 1942	
NEW ENGLAND												
Maine	0	4	0	2	2	2	0	0	0	0	0	1
New Hampshire	0	2	0	2	5	2	0	0	0	0	1	1
Vermont	0	2	1	6	3	1	0	0	0	0	1	1
Massachusetts	1	1	1	45	71	23	0	0	0	1	7	2
Rhode Island	8	0	0	0	1	1	0	0	0	0	0	0
Connecticut	27	1	1	6	4	4	0	0	0	3	1	1
MIDDLE ATLANTIC												
New York	30	11	11	48	40	61	0	0	0	8	17	17
New Jersey	5	23	4	11	25	18	0	0	0	8	3	4
Pennsylvania	3	1	1	32	32	42	0	0	0	10	9	15
EAST NORTH CENTRAL												
Ohio	1	3	9	49	12	50	0	0	0	10	6	10
Indiana	3	7	7	6	10	11	1	0	0	5	9	6
Illinois	70	27	8	33	28	52	2	0	1	4	6	16
Michigan [2]	4	8	10	18	29	46	0	0	0	4	2	6
Wisconsin	1	2	2	44	27	31	0	0	0	0	1	1
WEST NORTH CENTRAL												
Minnesota	5	7	7	13	21	13	1	0	0	0	0	1
Iowa	5	3	2	9	13	6	0	0	0	5	0	5
Missouri	11	4	1	9	23	13	0	1	1	7	6	14
North Dakota	2	1	1	3	3	3	0	0	0	0	0	0
South Dakota	0	0	0	10	3	5	0	0	1	0	0	0
Nebraska	5	0	0	3	0	5	0	0	1	0	0	1
Kansas	89	1	1	15	18	18	0	0	0	0	2	5
SOUTH ATLANTIC												
Delaware	0	0	0	0	1	0	0	0	0	0	0	0
Maryland [2]	0	2	1	10	6	9	0	0	0	3	2	11
District of Columbia	0	1	1	5	3	3	0	0	0	1	1	2
Virginia	3	3	3	13	11	11	0	0	0	7	9	9
West Virginia	2	4	1	22	14	12	0	0	0	5	5	12
North Carolina	4	5	5	27	24	24	0	0	0	3	8	12
South Carolina	0	2	2	6	4	1	0	0	0	4	4	10
Georgia	0	1	1	5	7	7	0	0	0	12	5	26
Florida	0	2	2	1	6	2	0	0	0	2	11	5
EAST SOUTH CENTRAL												
Kentucky	3	6	6	11	15	15	0	0	0	11	22	22
Tennessee	1	12	3	22	9	12	0	1	1	8	10	12
Alabama	1	2	2	4	8	13	0	0	0	4	9	13
Mississippi [2]	0	2	2	4	4	3	0	0	0	11	3	7
WEST SOUTH CENTRAL												
Arkansas	5	6	1	2	5	6	0	0	0	7	19	20
Louisiana	7	2	2	2	1	1	0	0	0	10	7	14
Oklahoma	40	1	1	5	6	6	0	0	0	10	2	15
Texas	67	2	2	22	22	12	1	0	0	17	20	49
MOUNTAIN												
Montana	0	1	1	3	5	5	1	0	0	3	0	1
Idaho	0	0	0	1	1	1	0	0	0	0	0	0
Wyoming	0	1	0	5	1	1	0	0	0	0	0	1
Colorado	7	1	1	19	7	8	0	0	0	1	1	2
New Mexico	5	0	0	1	1	1	1	3	0	3	2	2
Arizona	2	3	0	8	1	1	0	0	0	5	0	1
Utah [2]	9	0	0	11	1	2	0	0	0	0	0	1
Nevada	0	0	------	1	0	------	6	0	------	0	0	------
PACIFIC												
Washington	13	0	0	16	4	3	0	0	0	0	0	0
Oregon	13	0	0	8	5	6	0	0	0	5	1	3
California	94	6	7	62	36	36	0	0	1	0	6	6
Total	546	173	261	660	578	593	7	5	22	197	218	384
32 weeks	3,312	1,322	1,681	96,866	88,532	115,792	607	609	1,952	2,090	3,813	4,592

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 14, 1943 and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended Aug. 14, 1943	Whooping cough: Week ended Aug. 15, 1942	Whooping cough: Median 1938–42	Week ended Aug. 14, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	14	38	32	0	0	0	0	0	0	0	0	0
New Hampshire	0	3	0	0	0	0	0	0	0	0	0	0
Vermont	42	40	14	0	0	0	0	0	0	0	0	0
Massachusetts	75	165	147	0	0	1	0	1	0	0	0	0
Rhode Island	14	13	13	0	0	0	0	0	0	0	0	0
Connecticut	30	36	49	0	0	3	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	251	361	361	0	2	7	0	1	0	3	0	0
New Jersey	158	234	180	1	0	0	0	0	0	2	0	0
Pennsylvania	188	230	254	0	0	0	0	0	0	1	0	0
EAST NORTH CENTRAL												
Ohio	150	115	257	0	0	0	0	1	0	0	0	0
Indiana	83	51	21	0	0	0	0	0	0	0	0	0
Illinois	190	298	298	0	2	1	0	2	0	1	0	0
Michigan [2]	205	264	287	0	0	7	0	0	0	0	0	0
Wisconsin	236	220	220	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	58	51	51	0	1	1	0	0	0	0	0	0
Iowa	20	55	42	0	1	0	0	0	0	0	0	0
Missouri	99	4	18	0	0	0	3	0	0	0	0	0
North Dakota	29	13	13	0	0	0	0	1	0	0	1	0
South Dakota	5	4	4	0	0	0	0	0	0	0	0	0
Nebraska	22	2	13	0	0	0	0	0	0	0	0	0
Kansas	58	23	46	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	1	3	3	0	0	0	0	0	0	0	0	0
Maryland [2]	124	31	57	0	0	0	9	1	0	8	1	0
District of Columbia	27	12	12	0	0	0	0	0	0	0	0	0
Virginia	163	31	67	0	0	0	377	0	0	4	1	0
West Virginia	44	14	35	0	0	0	0	0	0	0	0	0
North Carolina	136	145	146	0	2	2	0	0	0	1	0	2
South Carolina	71	31	35	0	0	12	0	0	0	0	0	7
Georgia	8	7	20	0	0	13	3	0	0	0	1	35
Florida	27	6	6	0	0	0	0	0	0	0	0	7
EAST SOUTH CENTRAL												
Kentucky	38	29	58	0	2	9	0	0	0	1	0	0
Tennessee	64	75	44	0	0	0	5	0	0	4	0	1
Alabama	26	22	21	0	0	0	0	0	0	0	1	7
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	9
WEST SOUTH CENTRAL												
Arkansas	21	14	14	0	0	8	0	0	0	0	0	0
Louisiana	13	0	27	0	0	16	0	0	0	0	0	7
Oklahoma	16	15	15	0	0	0	0	0	0	4	0	1
Texas	191	111	132	0	29	318	0	1	0	0	1	55
MOUNTAIN												
Montana	17	21	21	0	0	0	0	0	0	2	5	0
Idaho	0	2	3	0	0	0	0	0	0	0	0	0
Wyoming	1	4	4	0	0	0	0	0	0	0	3	0
Colorado	40	20	22	0	0	16	0	1	0	1	0	0
New Mexico	10	4	8	0	0	5	1	0	0	0	0	0
Arizona	13	11	11	0	0	0	18	0	0	0	0	0
Utah [2]	89	22	37	0	0	0	0	0	0	0	1	0
Nevada	2	8	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	80	31	40	0	0	0	0	0	0	0	0	0
Oregon	43	32	26	0	0	0	0	0	0	0	0	0
California	155	123	167	0	2	9	0	12	0	0	0	0
Total	3,347	3,039	3,302	1	41	428	416	22	0	32	15	131
32 weeks	128,864	119,319	137,946	40	1,310	9,682	4,288	398	18	332	575	2,054
32 weeks, 1942	------	------	------	56	682	5,320	4,023	299	34	370	637	1,670

[1] New York City only.

[2] Period ended earlier than Saturday.

[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 1; Connecticut, 2; New Jersey, 3; Illinois, 1; Michigan, 1; South Carolina, 3; Georgia, 1: Louisiana, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 31, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	2	3	2	0	0	0	1	2
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	1	------	0	24	10	7	0	22	0	0	22
Fall River	0	0	------	0	2	0	0	0	1	0	0	0
Springfield	0	0	------	0	2	0	0	0	3	0	0	1
Worcester	0	0	------	0	1	0	9	0	2	0	0	0
Rhode Island:												
Providence	0	0	------	0	52	2	1	1	0	0	0	29
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	0	0	0	0	0
Hartford	0	0	------	0	0	0	1	0	1	0	0	2
New Haven	0	0	------	0	9	0	0	5	1	0	0	6
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	1	4	1	0	2	0	0	14
New York	3	0	------	0	223	23	25	5	33	0	5	78
Rochester	0	0	------	0	6	2	4	0	1	0	0	5
Syracuse	0	0	------	0	5	1	0	1	1	0	0	22
New Jersey:												
Camden	1	0	------	0	0	0	0	0	0	0	0	5
Newark	0	0	3	0	32	0	6	1	1	0	2	22
Trenton	0	0	------	0	0	0	0	0	0	0	0	1
Pennsylvania:												
Philadelphia	0	0	2	1	9	6	17	0	7	0	2	67
Pittsburgh	4	0	------	0	6	4	7	0	2	0	1	47
Reading	0	0	------	0	0	0	0	0	0	0	0	8
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	1	5	0	0	2	6	0	0	3
Cleveland	0	0	------	0	11	2	2	0	8	0	0	60
Columbus	0	0	------	0	8	0	2	0	1	0	0	11
Indiana:												
Fort Wayne	1	0	------	0	2	0	2	0	0	0	0	0
Indianapolis	0	0	------	0	5	0	6	0	4	0	1	23
South Bend	0	0	------	0	4	0	0	0	0	0	0	1
Terre Haute	0	0	------	0	0	1	3	0	0	0	1	0
Illinois:												
Chicago	7	1	------	0	64	5	17	5	6	0	1	100
Springfield	0	0	------	0	0	0	3	0	0	0	0	0
Michigan:												
Detroit	0	0	------	0	54	3	10	1	5	0	1	63
Flint	0	0	------	0	2	0	0	0	0	0	0	8
Grand Rapids	0	0	------	0	30	0	2	0	0	0	0	12
Wisconsin:												
Kenosha	0	0	------	0	2	0	0	0	0	0	0	6
Milwaukee	0	0	------	0	35	0	2	0	9	0	0	45
Racine	0	0	------	0	0	0	0	0	1	0	0	2
Superior	0	0	------	0	21	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	31	0	2	0	1	0	0	7
Minneapolis	0	0	------	0	3	1	2	2	5	0	0	7
St. Paul	0	0	------	0	11	0	2	0	1	0	0	34
Missouri:												
Kansas City	0	0	------	0	5	1	4	3	3	0	1	7
St. Louis	0	0	------	0	6	4	15	1	3	0	3	31

City reports for week ended July 31, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough case
			Cases	Deaths								
WEST NORTH CENTRAL—Continued.												
North Dakota:												
Fargo	0	0	------	0	14	0	2	0	0	0	0	6
Nebraska:												
Omaha	0	0	------	0	0	0	5	0	1	0	0	0
Kansas:												
Topeka	0	0	------	0	4	0	0	1	0	0	0	3
Wichita	0	0	------	0	1	0	4	8	1	0	0	16
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0	------	0	1	1	3	0	1	0	0	0
Maryland:												
Baltimore	0	0	1	1	32	4	6	0	1	0	1	82
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	1	0	1	1	20	4	9	0	3	0	1	24
Virginia:												
Lynchburg	0	0	------	0	3	0	0	0	0	0	0	10
Richmond	0	0	------	0	3	1	2	0	1	0	1	4
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	2
Wheeling	0	0	------	0	0	1	0	0	0	0	0	14
North Carolina:												
Wilmington	0	0	------	0	0	0	0	0	0	0	0	4
Winston-Salem	0	0	------	0	0	0	0	0	0	0	0	26
South Carolina:												
Charleston	0	0	------	0	0	0	3	0	0	0	0	0
Georgia:												
Atlanta	0	0	------	0	0	0	2	0	1	0	0	1
Brunswick	0	0	------	0	0	1	0	0	0	0	1	0
Savannah	0	0	------	0	0	0	0	0	1	0	0	1
Florida:												
Tampa	0	0	------	0	0	0	2	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	0	0	5	0	0	0	0	11
Nashville	0	0	------	0	0	0	4	0	0	0	0	13
Alabama:												
Birmingham	0	0	------	0	3	0	3	0	4	0	0	3
Mobile	0	0	------	0	0	1	5	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	1	0	1	0	0	0	0	1
Louisiana:												
New Orleans	2	0	6	0	1	1	15	0	0	0	3	3
Shreveport	0	0	------	0	0	0	1	1	0	0	0	0
Texas:												
Dallas	0	0	------	0	2	0	1	8	3	0	2	9
Galveston	0	0	------	0	0	0	2	0	0	0	0	0
Houston	0	0	------	0	1	1	9	8	0	0	2	7
San Antonio	0	0	------	1	0	0	4	0	0	0	1	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	2	0	1	0	0	0	1	0
Helena	0	0	------	0	0	0	0	0	0	0	0	1
Missoula	0	0	------	0	0	0	0	0	1	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	2	0	0	0
Colorado:												
Denver	1	0	2	1	0	0	4	0	4	0	2	19
Pueblo	0	0	------	0	0	0	0	1	0	0	0	12
Utah:												
Salt Lake City	0	0	------	0	9	1	0	0	1	0	0	46

City reports for week ended July 31, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	2	0	------	0	6	1	0	0	1	0	0	18
Spokane	0	0	------	0	2	0	2	0	1	0	0	10
Tacoma	0	0	------	0	2	1	0	0	0	0	0	6
California:												
Los Angeles	1	0	6	1	33	1	5	15	10	0	2	40
Sacramento	0	0	------	0	0	0	3	2	1	0	0	3
San Francisco	0	0	3	0	14	0	5	1	8	0	0	19
Total	24	2	24	7	827	91	262	72	176	0	36	1,162
Corresponding week, 1942	34	1	33	2	494	27	231	38	185	1	22	410
Average, 1938–42	55	------	29	[1] 7	[2] 580	------	[1] 233	------	239	2	44	1,044

Dysentery, amebic.—Cases: New York, 1; Richmond, 1; Los Angeles, 2.

Dysentery, bacillary.—Cases: Buffalo, 4; New York, 3; Detroit, 2; Baltimore, 1; Charleston, S. C., 18; Nashville, 3; Los Angeles, 8.

Dysentery, unspecified.—Cases: Baltimore, 1; San Antonio, 11.

Typhus fever.—Cases: New York, 2; Atlanta, 4; Brunswick, 1; Savannah, 6; Tampa, 3; Mobile, 1; Dallas, 4; Galveston, 1; Houston, 5; Los Angeles, 1.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,625,300)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	0.0	2.5	0.0	0.0	229	37.3	49.7	14.9	74.5	0.0	2.5	154
Middle Atlantic	3.6	0.0	2.2	0.4	126	17.8	26.8	3.1	21.0	0.0	4.5	120
East North Central	4.7	0.6	0.0	0.6	142	6.4	28.6	4.7	23.4	0.0	2.3	194
West North Central	0.0	0.0	0.0	0.0	150	12.0	72.2	30.1	30.1	0.0	8.0	229
South Atlantic	3.4	0.0	3.4	3.4	101	20.5	46.2	0.0	13.7	0.0	6.8	288
East South Central	0.0	0.0	0.0	0.0	18	5.9	101.0	0.0	23.8	0.0	0.0	160
West South Central	5.9	0.0	17.6	2.9	15	5.9	96.8	49.9	8.8	0.0	23.5	59
Mountain	8.4	0.0	16.8	8.4	92	8.4	42.0	8.4	67.3	0.0	25.2	656
Pacific	5.2	0.0	15.7	1.7	100	5.2	26.2	31.5	36.7	0.0	3.5	159
Total	3.6	0.3	3.6	1.1	125	13.7	39.5	10.8	26.5	0.0	5.4	175

PLAGUE INFECTION IN COLORADO AND WYOMING

Plague infection has been reported proved in fleas and ticks from ground squirrels, *C. richardsoni elegans*, and prairie dogs, *Cynomys ludovicianus*, collected in Colorado and Wyoming, as follows:

COLORADO

Las Animas County.—July 23, in a pool of 845 fleas and 4 ticks from 127 prairie dogs taken at a ranch 30 miles northwest of Springfield.

WYOMING

Carbon County.—July 21, in a pool of 61 fleas from 35 ground squirrels taken at Separation Flats, 20 miles north of Rawlins.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—An outbreak of dengue fever has been officially reported in Honolulu, T. H. About 40 cases, occurring in widely separated areas of the city, had been reported up to August 11. The probable source of the infection was reported to be airplane crews from the South Pacific. Intensive mosquito eradication measures were stated to be under way.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 17, 1943.—During the week ended July 17, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		26		33	89	25	41	12	20	246
Diphtheria	2	4		29		3	2			40
Dysentery (amebic)					2					2
Dysentery (bacillary)				4						4
German measles		1		1	32	6	6	7	15	68
Influenza					32	1			17	50
Measles		100	3	116	432	42	33	199	76	1,001
Meningitis, meningococcus				5	2	1				8
Mumps		24		13	98	34	18	27	20	234
Poliomyelitis					1					1
Scarlet fever		9	4	22	49	14	9	25	5	137
Smallpox							2			2
Tuberculosis (all forms)	2	2	3	91	40	21		10	95	264
Typhoid and paratyphoid fever			2	20	1	2				25
Undulant fever				6				1		7
Whooping cough		6		88	102	23	14	30	35	298

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Morocco (French).—For the month of June 1943, 27 cases of plague were reported in French Morocco.

Smallpox

Algeria.—For the period July 1–10, 1943, 38 cases of smallpox were reported in Algeria.

Morocco (French).—For the month of June 1943, 28 cases of smallpox were reported in French Morocco.

Spain.—During the 2 weeks ended June 12, 1943, 29 cases of smallpox were reported in Spain.

Typhus Fever

Algeria.—For the period July 1–10, 1943, 141 cases of typhus fever were reported in Algeria.

Bulgaria.—For the period March 11 to July 14, 1943, 1,015 cases of typhus fever were reported in Bulgaria.

Morocco (French).—For the month of June 1943, 1,225 cases of typhus fever were reported in French Morocco.

Rumania.—For the period July 24–31, 1943, 82 cases of typhus fever were reported in Rumania.

Slovakia.—For the period July 17–22, 1943, 11 cases of typhus fever were reported in Slovakia.

Spain.—For the 2 weeks ended July 12, 1943, 57 cases of typhus fever were reported in Spain.

* * *

DEATHS DURING WEEK ENDED AUGUST 7, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 7, 1943	Corresponding week, 1942
Data from 89 large cities of the United States:		
Total deaths	8,149	7,330
Average for 3 prior years	7,404	
Total deaths, first 31 weeks of year	291,784	265,640
Deaths under 1 year of age	617	559
Average for 3 prior years	533	
Deaths under 1 year of age, first 31 weeks of year	20,547	17,512
Data from industrial insurance companies:		
Policies in force	65,698,468	64,941,222
Number of death claims	10,889	11,150
Death claims per 1,000 policies in force, annual rate	8.6	9.0
Death claims per 1,000 policies, first 31 weeks of year, annual rate	10.1	9.5

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

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Public Health Reports

VOLUME 58 AUGUST 27, 1943 NUMBER 35

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Public Health Reports

Vol. 58 • AUGUST 27, 1943 • *No. 35*

STUDIES ON TRICHINOSIS

XV. SUMMARY OF THE FINDINGS OF *TRICHINELLA SPIRALIS* IN A RANDOM SAMPLING AND OTHER SAMPLINGS OF THE POPULATION OF THE UNITED STATES [1 2]

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During the past several years there has been conducted in this laboratory a survey of trichina infection through the examination of diaphragm material from persons coming to necropsy in hospitals in various parts of the United States. At different times interim reports (*1, 2, 3, 4, 5*) have been made on the progress of this survey. The work has now been completed and it is proposed in this paper to summarize the general results of the survey and in a subsequent publication to present the epidemiological considerations.

METHODS OF COLLECTION AND EXAMINATION OF MATERIAL

The survey was based on the examination of diaphragm muscle taken from routine necropsies of persons over one year of age without regard to the clinical or anatomical diagnosis. Instructions to the cooperating pathologists called for as much of the diaphragm, other than the tendinous portion, as was available. The weight of the diaphragm tissue received varied between 3 and 200 gm. with a mean of 72.6 gm. in the base series and a mean of 42.9 gm. in all other series. The specimens from the hospitals in Washington, D. C., were collected once a week. Those from points outside of Washington were forwarded by mail packed with an amount of dry boric acid sufficient to preserve the material while en route. This method of preservation of the muscle did not affect the viability of any trichina larvae which may have been contained in the material. The boric acid removed some of the normal moisture content of the muscle but the amount removed was not sufficient to affect significantly the counts of larvae present in a given amount of tissue (*5*).

[1] A list of the preceding papers in this series is given under "References."

[2] From the Division of Zoology, National Institute of Health.

Each diaphragm was examined by two methods. A detailed description of these methods and the technique employed for the preparation of the material has been published by Hall and Collins (*1*), Nolan and Bozicevich (*3*), and Kerr, Jacobs, and Cuvillier (*5*). In brief, a direct microscopic examination was made of a representative 1-gram sample which was pressed between two heavy plate glass slides held in a steel frame tightened by means of thumb screws. This material was examined under a low-power dissecting microscope (12.5 ocular and 1.0 objective) and the number of larvae and the condition of the larvae, i. e., whether they were alive or dead, calcified or uncalcified, were recorded. The remainder of the diaphragm was ground in a food chopper, digested in artificial gastric juice for approximately 18 hours, and then examined for trichina larvae by the use of the Baermann apparatus which is described in detail in the above-mentioned reports.

SOURCES OF THE MATERIAL

The various series of examinations reported herein were classified in accordance with the source of the material. These series are defined as follows:

1. The so-called *base series* consisted of diaphragms furnished by 10 hospitals in Washington, D. C., and 4 United States Naval Hospitals and 2 United States Marine Hospitals in eastern seaboard cities. The names and locations of these hospitals were given previously (*5*). It has been pointed out by Hall and Collins (*1*) that necropsy examinations from persons from the District of Columbia would probably be more representative of the population of the country as a whole than would material coming from any other one section. This is probably true to the extent that the population of Washington, D. C., is one of very cosmopolitan character because of the relatively low percentage of native-born individuals as compared with the very high percentage of persons who have come to Washington because of government employment or because of other opportunities afforded by the marked expansion in population in recent years.

2. The *negative series* was designed to include diaphragms from persons who had resided in States in which clinical trichinosis had never been reported at the time this survey was inaugurated. These States included New Hampshire, Oklahoma, Arizona, Wyoming, and Nevada.

3. The *traumatic series* was composed of diaphragm material from persons who suffered sudden natural death, and from persons who suffered traumatic death and were not hospitalized or were hospitalized for less than 24 hours. This series was designed to evaluate the criticism that a previous trichina infection may have influenced the hospitalization of individuals represented in the other series.

4. The *random series* consisted of diaphragm material selected at random from hospitals chosen on a chance basis. These hospitals were selected from a list of such institutions approved annually by the American Medical Association for residencies in specialties. The list used [J. Am. Med. Assoc., v. 107 (9), Aug. 29, 1936] contained the names of 726 hospitals reporting 100 or more autopsies per year, those with a smaller number of autopsies being discarded for our purposes. Duplications in the list reduced the actual number of institutions in this category to 147. Each of these hospitals was given an identifying number and the numbers were drawn at random as additional material was needed for the series. Each hospital was requested to furnish 10 diaphragms; some furnished a few more than this number while a few failed to complete their quota. In selecting the diaphragms the pathologist was requested to supply every other diaphragm if the total number of autopsies conducted during the year was between 100 and 200. In cases in which the total number yearly was between 200 and 300, every third diaphragm was selected and so on up to every tenth diaphragm if the number of yearly autopsies was over 1,000.

A total of 113 of the 147 hospitals actually participated in furnishing material for the series; in addition 2 hospitals supplying diaphragms for the rural series furnished a few specimens from individuals who had lived in cities, this material being placed in the random series. Twelve of the 147 hospitals were not contacted, while 22 others were contacted but failed to indicate a willingness to cooperate. The fact that such a large percentage of hospitals available from the list in question actually cooperated in the survey would tend to nullify the original conception that selection was to be on strictly a chance basis. Actually, therefore, this series cannot properly be termed a random one but can be considered as providing a representative sample of necropsy material in hospitals throughout the United States over the period of time covered by this survey.

5. The *rural series* consisted of diaphragms from persons who had resided on farms or in villages of 1,000 population or less. The series was designed to counterbalance the large preponderance of urban cases in the other series and to furnish evidence as to the incidence of trichinae in a population group which was thought to be exposed to infection in a manner somewhat different than are persons residing in urban areas. Considerable difficulty was encountered in securing necropsy material from persons in the rural population chiefly because hospitals in small cities and towns seldom have a resident pathologist on the staff and because relatively few autopsies are conducted in such institutions. Furthermore, many such autopsies are carried out after the body has been embalmed. Much of the material furnished us fell in this category and approximately 100 such diaphragms were

examined but were not included in this series because the digestion of preserved material is unsatisfactory and does not furnish information which would be comparable with the data obtained from the examination of unembalmed material.

6. The *Washington State series* was carried on in cooperation with the State Health Department and was intended to furnish evidence concerning opportunities for exposure to trichinosis in that State.

7. The *Oregon State series* was likewise a cooperative project with the State Health Department. It was started rather late in the course of the survey and was interrupted because of the war-induced shortage of personnel on the medical staffs of the hospitals involved.

8. The *Jewish series* included diaphragms from orthodox and unorthodox Jews with the view of demonstrating the degree of protection furnished this religious group by the Mosaic code.

TABLE 1.—*Distribution of hospitals cooperating in various series of trichinosis survey*

Series	Number of hospitals	Number of cities represented	Number of States represented
Base	16	7	5 and D. C.
Negative	16	12	6
Traumatic	2	2	2
Random	115	66	27
Rural	51	44	23
Washington State	4	2	1
Oregon	4	2	1
Jewish	1	1	1
Total	209	136	66 and D. C.
Duplications	20	22	29
Total less duplications	189	114	37 and D. C.

Table 1 shows the number of hospitals and the number of cities and States represented in each of the series in the survey. The random series represented by far the most widely distributed sources of material since the diaphragms comprising this series were furnished by 115 hospitals in 66 cities in 27 States. Although the rural series contained a relatively small number of diaphragms, these diaphragms came from 51 hospitals in 44 cities in 23 States. The negative series was originally intended to comprise the 5 States mentioned above but material was actually received from 6 States for the reason that one of the cooperating pathologists in New Hampshire also conducted autopsies in a neighboring State, Vermont, and supplied a single diaphragm from that State. In all, the necropsy material represented in the survey came from 189 hospitals located in 114 cities in 37 States and the District of Columbia. Nearly every type of institution was represented, including general hospitals, children's hospitals, industrial hospitals, and those devoted to the treatment of cancer, tuberculosis, mental diseases, chronic diseases, and contagious diseases.

The hospitals included those operated by private individuals, private organizations, States, counties, cities, and governmental agencies such as the Army, Navy, Public Health Service, and Veterans' Administration. The divergent character and wide distribution of the institutions furnishing material for the survey assured an adequate sampling of the various population groups in the United States.

INCIDENCE OF INFECTION

Table 2 presents the results of the examination of the diaphragms in the various series. The survey comprised a total of 5,313 cases, of which 855, or 16.1 percent, were positive for trichinae. If the Jewish series is omitted from the reckoning, the other examinations totaled 5,113 diaphragms, of which 854, or 16.7 percent, were positive. This figure is probably more representative of the true incidence figure than is the 16.1 percent because of the low incidence in the Jewish group which is not itself representative of the Jewish population of the entire country, since all specimens came from only one hospital in New York City.

TABLE 2.—*Findings of* Trichinella spiralis *in various series of diaphragm material examined in the National Institute of Health from 189 hospitals in 37 States and the District of Columbia*

Series	Number of diaphragms examined	Number of diaphragms found positive	Percent diaphragms found positive
Base (diaphragms from 10 hospitals in Washington, D. C., 2 Marine and 4 Naval hospitals)	3,000	488	16.3
Negative (diaphragms from States in which clinical trichinosis had never been reported)	200	35	17.5
Traumatic (diaphragms from persons suffering sudden death)	283	48	17.0
Random (diaphragms selected at random from hospitals selected at random)	1,125	206	18.3
Rural (diaphragms from persons residing on farms or in villages)	295	36	12.2
Washington State (diaphragms from residents of this State)	200	40	20.0
Oregon State (diaphragms from residents of Oregon)	10	1	----------
Total	5,113	854	16.7
Jewish (diaphragms from orthodox and unorthodox Jews)	200	1	0.5
Grand total	5,313	855	16.1

In comparable series there was a wide variation in the number of positive specimens in each unit of 100 cases, this variation ranging from 11 to 24. Considering the 5,313 cases as a whole, the standard error of the incidence of 16.1 percent is ± 0.5041 when computed by the formula $\sqrt{\frac{pq}{n}}$, where p is the percentage of positive cases, q the percentage of negative cases, and n the total number of cases examined.

Since the incidence of trichinae in the base series corresponds so closely to that obtained for all other series, it is believed that the contention of Hall and Collins (*1*) concerning the cosmopolitanism of

the group represented in this series is amply substantiated. It would appear also that the incidence which may be found in necropsy material from similar population groups elsewhere in the United States will not differ materially from the percentage of positives encountered in this series.

In addition to the 283 cases with 48 positives represented in the so-called traumatic series, there were included in the other series in the survey a total of 54 cases with 12 positives which come within the specifications for material in this series. Thus represented in the survey as a whole there is a total of 337 cases in which the individuals suffered sudden natural death or traumatic death without hospitalization or with hospitalization for less than 24 hours. Sixty, or 17.8 percent, of the 337 cases were positive for trichinae. Of these total cases, 95 represented cases of sudden natural death, 140 cases of accidental death, 60 cases of homicide, 34 cases of suicide, and 8 cases in which the nature or the cause of death was not known. Statistically the incidence of trichina infection encountered in these cases of sudden death does not differ significantly from the general incidence figure, thus indicating that the examination of material from persons coming to necropsy in hospitals provided valid information concerning the incidence of the trichina parasite in that part of the population represented in the present sampling.

The random series comprised 1,125 cases, of which 206, or 18.3 percent, were positive. Because of the divergent origin of the material, the results obtained in the examination of diaphragms in this series offer strong support in the way of validating the findings in the other series.

The incidence figure of 12.2 percent for the 295 cases in the rural series barely shows a significant statistical difference from the percentage obtained in the urban material, as represented by most of the diaphragms in the other series. However, when there are added to the number of diaphragms in the rural series, the 141 diaphragms from the members of the rural population represented in the other series, there is a total of 436 cases, of which 64, or 14.7 percent, were positive for trichinae. This figure is not significantly different from that of the urban material and on the basis of these examinations one cannot conclude that rural dwellers are less frequently exposed to trichinosis than are members of the urban population. It has been quite well established that swine fed on uncooked garbage represent the chief source of trichina infection in market pork and such hogs, for the most part, go on the market in cities. Persons residing on farms or in villages usually buy less market pork than do urban dwellers and might reasonably be less exposed to infection through pork from swine commercially raised on uncooked garbage. However, such a theory is not substantiated by the data in hand.

The results of the examination of diaphragms in the Washington State series, in which 40, or 20.0 percent, of the 200 cases were positive for trichinae, are not statistically different from the results obtained for the survey as a whole. Apparently the degree of exposure to trichinosis in this State is no different from that encountered in most other parts of the United States, as indicated by the results of the present survey, and a larger series of cases from the State would probably demonstrate an incidence of trichinae very similar to the incidence found in the survey as a whole.

The Jewish series with only one case positive of the 200 examined furnishes a striking contrast to the results of the other series. According to the records of the hospital from which these cases were derived, 82 of the individuals in this series were orthodox Jews, 23 were unorthodox, and the religious tenets of the remaining 95 were unknown. It is probable that a high percentage of these 95 were orthodox, since 75 percent of the cases in the series were of foreign birth and 70.5 percent were over 45 years of age, and individuals in these categories are less likely to have deviated from their faith. It is also probable that many unorthodox individuals in this series were less exposed to trichina infection because, despite their unorthodoxy, they lived in a community with more orthodox individuals and would therefore be less likely to consume pork. Moreover, the criteria for orthodoxy and unorthodoxy are loose, as is evidenced by the fact that the one positive case occurred in an individual who had claimed to have followed his religious tenets strictly. It is possible that a survey of Jews from various parts of the country, rather than only from a metropolitan area like New York, would have revealed a somewhat higher incidence figure. However, this survey amply demonstrates the protection afforded by adherence to the Mosaic code.

In table 3 is recorded the distribution of the cases by State and geographical regions with separation into urban and rural groups. Allocation is made to the State of origin of the individual, where known, with a result that a total of 41 States and the District of Columbia is represented even though the diaphragm material came from hospitals in only 37 States and the District of Columbia. Many of the States are represented by relatively few cases and for this reason it is not possible to make comparisons between the incidence figures for States. However, the incidence of trichinae on a regional basis shows in most cases no significant variations. The Middle Atlantic States represented by 809 cases show an incidence of 12.9 percent. However, 200 of the cases were included in the Jewish series and only one of these cases was positive for trichinae. Omitting these 200 cases as overloading the sample from this area, there would be 103 positives in

609 cases, or an incidence of 16.9 percent. This incidence is not significantly different from that noted for the survey as a whole. The East South Central, West South Central, and Mountain States are represented by relatively few cases and on the basis of this small number definite conclusions cannot be drawn as to the probable incidence of human infection with trichinae in these areas.

TABLE 3.—*Distribution of cases by urban and rural population groups in all States represented with allocation to State of origin where known*

State	Diaphragms from urban population		Diaphragms from rural population		Diaphragms from both population groups		
	Total number	Number positive	Total number	Number positive	Total number	Number positive	Percent positive
NEW ENGLAND							
Maine	---	---	---	---	---	---	---
New Hampshire	84	14	34	4	118	18	15.3
Vermont	1	0	9	4	10	4	---
Massachusetts	130	21	---	---	130	21	16.2
Rhode Island	10	3	---	---	10	3	---
Connecticut	10	4	8	0	18	4	---
Total for area	235	42	51	8	286	50	17.5
MIDDLE ATLANTIC							
New York	451	40	5	1	456	41	9.0
New Jersey	44	9	1	0	45	9	---
Pennsylvania	302	52	6	2	308	54	17.5
Total for area	797	101	12	3	809	104	12.9
EAST NORTH CENTRAL							
Ohio	82	16	5	0	87	16	---
Indiana	28	6	24	7	52	13	---
Illinois	111	18	6	1	117	19	16.2
Michigan	61	10	16	0	77	10	---
Wisconsin	19	4	3	1	22	5	---
Total for area	301	54	54	9	355	63	17.7
WEST NORTH CENTRAL							
Minnesota	27	7	23	2	50	9	---
Iowa	9	1	28	5	37	6	---
Missouri	59	11	1	0	60	11	---
North Dakota	---	---	---	---	---	---	---
South Dakota	---	---	1	1	1	1	---
Nebraska	7	1	32	6	39	7	---
Kansas	5	0	6	1	11	1	---
Total for area	107	20	91	15	198	35	17.7
SOUTH ATLANTIC							
Delaware	---	---	1	0	1	0	---
Maryland	374	84	13	2	387	86	22.2
District of Columbia	2,485	389	40	5	2,525	394	15.6
Virginia	30	4	3	1	33	5	---
West Virginia	1	0	---	---	1	0	---
North Carolina	11	3	7	0	18	3	---
South Carolina	15	1	---	---	15	1	---
Georgia	23	2	10	0	33	2	---
Florida	10	2	5	0	15	2	---
Total for area	2,949	485	79	8	3,028	493	16.3
EAST SOUTH CENTRAL							
Kentucky	---	---	---	---	---	---	---
Tennessee	40	8	1	0	41	8	---
Alabama	21	4	13	2	34	6	---
Mississippi	---	---	10	1	10	1	---
Total for area	61	12	24	3	85	15	17.6

TABLE 3.—*Distribution of cases by urban and rural population groups in all States represented with allocation to State of origin where known*—Continued

State	Diaphragms from urban population		Diaphragms from rural population		Diaphragms from both population groups		
	Total number	Number positive	Total number	Number positive	Total number	Number positive	Percent positive
WEST SOUTH CENTRAL							
Arkansas			2	0	2	0	
Louisiana							
Oklahoma	49	9	38	8	87	17	
Texas	20	2	1	1	21	3	
Total for area	69	11	41	9	110	20	18.2
MOUNTAIN							
Montana							
Idaho							
Wyoming	2	0			2	0	
Colorado	8	2	22	1	30	3	
New Mexico			1	0	1	0	
Arizona	42	3	1	0	43	3	
Utah							
Nevada	4	2			4	2	
Total for area	56	7	24	1	80	8	
PACIFIC							
Washington	184	35	16	5	200	40	20.0
Oregon	28	4	5	0	33	4	
California	90	20	39	3	129	23	17.8
Total for area	302	59	60	8	362	67	18.5
Grand total	4,877	791	436	64	5,313	855	16.1

EFFICIENCY OF METHODS OF EXAMINATION

Table 4 shows the respective efficiencies of the microscopic and digestion-Baermann methods, singly and together, in detecting infections with live, mixed live and dead, and dead larvae in the 855 positive diaphragms encountered in the survey. The data in this table confirm previous conclusions regarding the respective efficacies of the two methods of examination in detecting larvae in various stages. It will be seen that the majority of the cases with live larvae were detected by the digestion-Baermann method, the majority of the cases with dead larvae by the direct microscopic method, and the majority of the cases with mixed live and dead larvae by a combination of the two methods. As regards all infections in which dead larvae were present, including cases with mixed live and dead larvae, the direct microscopic method detected 535, or 87.7 percent, of 610 such cases. Of the 387 cases in which live larvae were encountered, the digestion-Baermann method detected 381, or 98.4 percent. By itself, the direct microscopic method detected 67.1 percent of all infections with dead larvae, but only 1.6 percent of the infections with live larvae, and 1.4 percent of infections with mixed live and dead larvae. The digestion-Baermann method alone disclosed 72.2 percent of all infections with live larvae, 15.5 percent of all infections

with mixed live and dead larvae, and 11.3 percent of infections with dead larvae. However, considering all 855 positive cases, the direct microscopic method detected 603, or 70.5 percent, while the digestion-Baermann method detected 535, or 62.6 percent. This apparently greater effectiveness of the microscopic method in detecting infections is attributable to the predominance of cases with only dead larvae. The chief point of emphasis, however, concerns the fact that either method used alone would have permitted a considerable percentage of the positive cases to pass unrecognized; specifically, the microscopic method would have missed 29.5 percent and the digestion-Baermann 37.4 percent of the positive cases.

TABLE 4.—*The respective efficiency of the microscopic and digestion-Baermann methods, singly and together, in detecting infections with live, mixed live and dead, and dead larvae in 855 positive cases examined by both methods*

State of larvae	Positive cases		Efficiency of methods of examination employed					
			Cases detected only by microscopic method		Cases detected only by digestion method		Cases detected by both methods	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Live	245	28.6	4	1.6	177	72.2	64	26.1
Mixed live and dead	142	16.6	2	1.4	22	15.5	118	83.1
Dead	468	54.8	314	67.1	53	11.3	101	21.6
Total	855	100.0	320	37.4	252	29.5	283	33.1

The use of the two methods of examination probably detected nearly all of the infections in this series of examinations, although actually the combination of the methods probably failed to disclose a small percentage of cases with dead larvae of the order of less than one per gram. In this connection, one of us (*6*) examined by the direct microscopic method a 10-gram sample from each of 100 diaphragms which had been recorded negative by the usual methods of examination. This further examination disclosed 6 positive specimens in the 100 cases, thus indicating that a small number of cases has undoubtedly been missed by the technique employed and that our incidence figure is probably less than is the true incidence of the parasite in the cases sampled.

COMPARISON OF FINDINGS WITH THOSE OF OTHERS

Several papers in this series have contained summaries of the findings of trichinae in surveys conducted by other investigators. The last of these summaries was included in the paper by Kerr, Jacobs, and Cuvillier (*5*). Since that paper was written, Sawitz (*7*) has reported 14 positives in 200 examinations at New Orleans; Butt and Lapeyre (*8*) found 31 positive cases in 170 at Los Angeles; Harrell and Johnston

(*9*) encountered 3 positives in 105 cases, mostly of rural origin, at Durham, N. C.; Oosting (*10*) obtained 27 positive findings in 134 examinations at Dayton, Ohio; Catron (*11*) found 44 positives in 300 individuals at Ann Arbor, Mich.; Gould (*12*) reported 93 positive cases among 500 examined at Eloise, Mich., and later (*13*) 185 positives in 731 additional examinations at the same place; Most and Helpern (*14*) encountered 22 positives among 100 cases in New York City; Merrill (*15*) failed to find any cases positive for trichinae in 47 examinations at Logan, Utah; and Meleney (*16*) reported 21 positives in 209 examinations at Nashville.

A summary of the published findings of other investigators indicates that, other than the National Institute of Health survey, there has been conducted in the United States a total of 6,618 examinations, of which 1,002, or 15.1 percent, were positive for *Trichinella spiralis*. In many of these surveys, only one method of examination was employed, although some workers examined histological sections as well as both direct microscopic and digestion-Baermann preparations. Most of the surveys were based only on the examination of diaphragm muscle, although in a few cases muscles other than the diaphragm were also included. When other muscles have been examined, the incidence of infection has usually been increased slightly since a few positive findings have been encountered in muscles other than the diaphragm when the latter muscle was negative for trichinae. For purposes of comparing the data of these other investigators with ours, we have analyzed their published findings. These findings have been placed on a basis comparable with that employed in the present studies by eliminating from consideration positive findings based on the examination of muscles other than the diaphragm and by the exclusion of findings obtained by the employment of methods of examination other than the direct microscopic and the digestion-Baermann methods. Where only one of these methods was employed, we have applied the respective correction figure obtained in the present survey in order to determine the approximate number of positive cases which were missed by failure to make use of the combined methods of examination. Based on such treatment of the data, our analysis discloses a total of 1,083 calculated positive cases in 6,618 diaphragm examinations, or an incidence of trichinae of 16.4 percent. If we add our findings of 855 positives in 5,313 cases, we arrive at a grand total of 11,931 such examinations for the United States, with 1,938 computed positives, or an incidence of 16.2 percent. Thus the sample is sufficiently large to warrant generalization and, since the data from the traumatic series indicate that hospitalization had no bearing on the incidence of infection, we can conclude that of the total persons dying in the United States over the period of these surveys, one out of six was infected with the trichina parasite.

DEGREE OF INFECTION AND STATE OF LARVAE

Degree of infection.—Table 5 presents data concerning the intensity of infection in terms of larvae per gram and the state of the larvae in the 855 positive diaphragms in this survey. It will be noted that the majority of the individuals were lightly infected since 733, or 85.7 percent, of the 855 cases had less than 11 larvae per gram of diaphragm muscle. Eighty-four, or 9.8 percent, had infections between 11 and 50 larvae per gram.

TABLE 5.—*Intensity of infection in terms of larvae per gram and state of larvae in 855 positive diaphragms*

Group No.	Larvae per gram	Number of cases	Percent of total cases	Number of cases with larvae in various states		
				Live	Mixed	Dead
1	Less than one	251	29.3	173	22	56
2	1-10	482	56.4	62	92	328
3	11-50	84	9.8	7	19	58
4	51-100	15	1.8	1	6	8
5	101-500	18	2.1	2	2	14
6	501-1,000	5	.6		1	4
7	Over 1,000	0				
		855	100.0	245	142	468

Unfortunately, evidence available at the present time is not sufficient to enable one to draw definite conclusions concerning the degree of trichina infection necessary to produce clinical symptoms of disease. It is probable that such a relationship would be governed by a number of variables, such as age, the general state of health, the presence of concomitant disease or borderline conditions affecting the general resistance of the individual, and other factors. On the basis of the results on the first 300 diaphragm examinations in the base series, Hall and Collins (*1*) arbitrarily defined an infection of 100 larvae or more per gram as one probably capable of causing pronounced symptoms of disease. Since that estimate was made, we have had good reason for revising these arbitrary standards because we have found infections of less than 100 larvae per gram of diaphragm muscle in persons succumbing to trichinosis. In fact, it is quite apparent that infections of 51 to 100 larvae per gram are capable of causing severe illness and it is highly probable that infections of 11 to 50 larvae per gram may cause pronounced symptoms. With regard to infections of less than 11 larvae per gram, until further evidence is available we can only say that such infections have an unknown bearing on the health of the individual. We do not intend to imply, of course, that any sharp line of demarcation can be drawn between the degree of infection and its relation to clinical symptoms, nor do we mean to intimate, for example, that an infection of 11 larvae per gram will cause illness whereas an

infection of 10 larvae may not do so. The groups are arbitrarily selected only for purposes of comparison.

On the basis of the above-mentioned estimates, it is seen that 4.5 percent of the positive cases had infections of more than 50 larvae per gram. From our present knowledge it seems reasonable to assume that these individuals probably suffered clinically at the time their trichina infection was acquired.

On the basis of evidence in the literature and that obtained from 174 positive cases in the base series, Nolan and Bozicevich (*3*) suggested with quite good reason that an infection of 1,000 or more larvae per gram might well be termed a critical one. It is of interest to note that in 855 positive individuals in 5,313 examinations we have not found any case of infection of over 1,000 larvae per gram. Gould (*13*) also failed to find any infections of this degree in the 278 positive cases in the 1,231 examined by him at Eloise, Mich. In fact, we are unable to locate in the literature any findings of 1,000 larvae or more per gram of diaphragm muscle in persons coming to necropsy from conditions other than clinical trichinosis. It appears probable that infections of this degree usually, if not invariably, result in death.

Clinical records and past histories of the individuals involved in this survey were not furnished by the cooperating pathologists and no general request was made for these data because of the burden such a request would have imposed. In only 6 of the 5,313 cases was effort made to obtain a detailed history of the patient. The first two of these cases are cited by Kerr, Jacobs, and Cuvillier (*5*). A third case involved the finding of an infection of 60 larvae per gram in a 6-year-old child who died of pneumococcic meningitis. The larvae were dead and calcified. Because of the early age at death and the presence of calcified larvae, effort was made to determine the age at which infection took place. The family physician had treated mother and child at various times over a 3-year period prior to the death of the boy. During this time, the mother had an influenza-like syndrome several times within a period of a few weeks, the diagnosis at the time of consultation being myositis and rheumatism. The child had influenza on one occasion and on another occasion suffered a gastro-intestinal upset accompanied by a pin-point rash on the shoulders and upper chest, and swollen tonsils. The diagnosis at that time was tonsillitis. No differential blood counts were made on either the mother or child on the occasion of any of the visits. Since the cysts and larvae were all calcified, it seems probable that infection had taken place earlier than 3 years before death. As the family had moved from a far distant State, it was not possible to obtain information as to the prior medical history.

A fourth case involved that of a 74-year-old female in which there was encountered an infection of 615 larvae per gram. The cysts were

calcified and the larvae dead. Inquiry revealed that the medical history contained the statement that the woman had had trichinosis about 40 years before, apparently before emigrating from Germany to the United States. At that time trichinosis was a common disease in Germany and German physicians were thoroughly familiar with its manifold clinical manifestations. The other two cases in which information was obtained from the clinical history are referred to later in this paper.

In the past those individuals who have chosen to minimize the significance of trichinosis as a public health problem in this country have apparently set great store by the fact that most investigators who have carried out necropsy surveys for trichinae stated that no clinical history of trichinosis could be obtained in cases in which the parasite was found at autopsy. As a matter of fact, such statements carry very little weight and in no way refute the possibility that heavily infected individuals may not have had clinical trichinosis at some time during their life without the disease having been recognized as such. If a diagnosis of trichinosis was never made, the patient would certainly have no knowledge that he or she ever suffered from the disease and a notation of the fact would not be included in the medical history. Certainly, most patients would never remember all the attacks of influenza or similar conditions which they may have had during the course of their lifetime and would probably not regard with special significance any condition which might simulate such ailments, assuming that they were able to make any differentiation. The fact remains then that in the one case in this survey in which trichinosis appeared in the past history of the patient, the circumstance came to our notice. When no notation of this sort appears in the clinical history, it may mean that the patient has never had clinical symptoms, or it may mean that he or she has suffered from clinical trichinosis without the disease ever having been recognized. In any event, it is not safe to assume, as some have done, that the infection was of a subclinical nature.

In this connection, Wyrens, Tillisch, and Magath (*17*) have taken issue with individuals who have suggested that the incidence and degree of infection encountered in trichina surveys would tend to indicate that many cases of clinical trichinosis are not recognized as such at the time of illness. The reasoning of these authors would be much more convincing if they did not later in the course of their paper show that in only 6 of their 19 clinical cases of trichinosis was the disease recognized by the referring physician or the physician in the Mayo Clinic who first saw the patient. The other diagnoses in the series included nephritis in 2 cases, indeterminate diarrhea in 2, and conjunctivitis, sinusitis, traumatic headache, secondary anemia, encephalitis, neurosis and migraine, respectively, in the others.

State of larvae.—From table 5, it will be seen that infections with dead larvae predominated over infections with live larvae and infections with live larvae predominated over infections with mixed live and dead larvae. The predominancy of infections with dead larvae might well be expected since the majority of the cases represented are those of individuals dying past middle age. Larvae from infections acquired earlier in life would have had ample opportunity with the passing of years to die and calcify. The rapidity with which larvae may die is evidenced by the fact that in table 6 three of the four positive cases occurring in the age group 5 to 9 were represented by dead larvae.

TABLE 6.—*Degree of trichina infection as related to age at death in 855 positive cases*

Age at death	Number positive cases	Number of cases with the specified number of larvae per gram of diaphragm muscle					
		Less than 1	1–10	11–50	51–100	101–500	501–1,000
Under 5	1	1					
5–9	4	1	2		1		
10–14	8	6	1		1		
15–19	7	4	3				
20–24	21	6	13	2			
25–29	27	14	11	2			
30–34	37	15	18	4			
35–44	143	58	76	7		1	1
45–54	100	62	109	18		1	
55–64	186	47	99	26	4	7	3
65–74	156	29	102	14	4	6	1
75 and over	71	8	46	10	5	2	
Unknown	4		2	1		1	
Total	855	251	482	84	15	18	5

Of the 245 positives with live larvae, it will be noted that 173, or 70.6 percent, occurred in cases with less than one larva per gram of diaphragm muscle (table 5). This would seem to indicate some correlation between a high degree of infection and the rapidity with which trichinae die and califiy, a theory which was proposed by Hall and Collins (*1*) on the basis of 41 positive diaphragms in 300 examinations in the base series. While the theory may be tenable, we do not feel that our data on a much larger number of positives either prove or disprove it, since there are too many evident exceptions. Moreover, it has already been pointed out that our technique fails to detect infections with dead larvae of the order of less than one per gram.

DEGREE OF INFECTION AS RELATED TO AGE AT DEATH

As seen from table 6, the degree of infection was found to increase with advancing years. Of the 438 infected individuals of 54 years of age or less, which is close to the median age of 53 years for all infected individuals, 38, or 8.7 percent, had infections of over 10 larvae per

gram, whereas of the 413 individuals of 55 years and over, 82, or 19.9 percent, had infections of over 10 larvae per gram. While the 413 individuals of 55 years and over comprised 48.5 percent of the total number of positive individuals of known age, they harbored 68.3 percent of the infections of over 10 larvae per gram. Statistical calculations show that this difference in the percentage of heavier infections in the later years of life is not due to chance.

There are three possible explanations of the increase in degree of infection with advancing years. The first involves a possible difference in exposure to trichinosis earlier in the life of individuals in the older age groups of our series. The second explanation rests on the possibility that we have represented here only those persons who survived heavy trichina infections and that other individuals have had equally heavy trichina infections from which they succumbed earlier in life. The third explanation concerns the hypothesis that repeated infections occur in man and that these heavy infections do not necessarily represent a single exposure but may be due to superimposed infections. These three possibilities will be considered in turn.

There is no substantial evidence in favor of the view that individuals in the older age groups may have been more heavily exposed to trichinosis in their earlier years. However, the development of rapid slaughterhouse procedures has resulted in larger numbers of swine being killed at the individual packing plants, and there has been coincidentally a concentration of slaughterhouse business into large abattoirs. With this development the practice of making sausage and other processed meat products from the trimmings of a few animals has grown into the preparation of hundreds of pounds of such products from hundreds of hogs. Thus the trichina larvae present in the meat of a few infected animals are now diluted with many more pounds of uninfected meat, and the chances are conceivably greater that the small doses of larvae obtained from such meats may result in infections lighter than those which formerly occurred.

The possibility that the heavy infections in individuals in the higher age groups may represent severe cases which survived the disease while other equally heavy cases succumbed has some support in data which indicate that 74.2 percent of all persons reported to have died of trichinosis in the United States during the decade 1931–40 were under 55 years of age whereas in 1938, the median year of this survey, only 34.5 percent of the total deaths occurred before the age of 55. This hypothesis could be more properly evaluated if more information were available as to the numbers of larvae per gram resulting in clinical and fatal cases of trichinosis. Of interest in this regard is the fact that, occurring as an extremely casual circumstance, two of the diaphragms in our random series were from persons who actually died of

trichinosis, even though the clinical and anatomical diagnoses incorrectly involved other conditions. Death in one of these cases occurred at the age of 13 years and death in the other at the age of 36 years. The former case falls in the group in table 6 having an infection of 51 to 100 larvae per gram of muscle while the latter case falls in the group of 501 to 1,000 larvae per gram. However, these cases also lend support to the third explanation offered above, that of the possibility of superimposed infections, since both of these cases represent fatal infections superimposed on an old infection as proved by the presence of old calcified cysts with dead larvae, unencysted third-stage larvae, and even second-stage larvae.

Because of the occurrence of these cases, in which live larvae were found along with dead and degenerated larvae, the possibility that the heavy infections in the older age groups represent superimposed infections has more basis than the other two hypotheses. Arrayed against this idea, however, is the evidence offered by the work of Ducas (*18*), McCoy (*19*), and numerous more recent investigators who have shown that a certain amount of resistance to superimposed infections follows an initial trichina infection in rats, and some writers reasoning by analogy have asserted that a similar resistance follows a trichina infection in man. In fact, Magath (*20*) has gone so far as to suggest that a light trichina infection, such as occurred in many of our positive cases, "may be looked upon as a benefit rather than a detriment" to the individual. We do not believe that the available evidence warrants an assumption of this sort. Apparently Magath, himself, later saw reason to doubt the validity of his statement, since in the paper by Wyrens, Tillisch, and Magath (*17*) it is stated that "the presence of immunity in man is only suggested by experimental studies with animals." This change of viewpoint was perhaps occasioned by the apparent finding of 2 cases of reinfection in the 19 cases of clinical trichinosis described by the above-mentioned authors, together with the fact that they noted the cases of second infections reported by Kaufman (*21*) and Lehrfeld and Breisacher (*22*).

In addition to these cases and to our 2 cases mentioned above, there must be added one record which we have of finding calcified cysts with dead larvae and unencysted third-stage larvae in muscle biopsied from a clinical case of trichinosis, and the record of Most and Helpern (*14*), who found several cases of superimposed infection among the 22 positives encountered in 100 diaphragm examinations in New York City. Evidence is also available from our survey data on cases with over 10 larvae per gram, which indicates further that superimposed infections do occur. Because of the lack of any marked differences in the condition of larvae or cysts, we have been unable to determine whether cases with only live or dead larvae represent one or more than

one infection. However, a conservative appraisal of the 28 cases with mixed live and dead larvae with counts of over 10 larvae per gram indicated that 8 probably represented superimposed infections and 2 others, which have been discussed above, definitely represented such infections. In only 3 of these 10 cases, however, was the age at death over 53 years. This can be interpreted only as indicating that superimposed infections did not occur in the latter years of life in most individuals of the older age groups of our series. If such infections had taken place earlier in the life of these individuals, evidence of their presence would probably have been obliterated over the long period of time during which calcification and death of the larvae might have occurred.

It is probable, therefore, that all three of the factors discussed above were responsible for the higher degree of infection found in the older age groups. Such individuals might have been exposed to heavier infections, some may represent survivals of critical infections, while others could have had one infection superimposed on another. In regard to this last possibility, the evidence at hand demonstrates beyond any doubt that superimposed trichina infections do occur in man, that a previous infection does not protect against acquisition of or death from a superimposed infection, and that not all cases of trichinosis are diagnosed clinically or even anatomically in spite of assertions to the contrary.

SUMMARY AND CONCLUSIONS

Diaphragms have been examined from a total of 5,313 individuals coming to necropsy in 189 hospitals located in 114 cities in 37 States and the District of Columbia. Of these cases, 855, or 16.1 percent, were positive for *Trichinella spiralis*. Omitting results of examinations in a series of 200 diaphragms from Jews, of which only one was positive, the representative cases totaled 5,113, of which 854, or 16.7 percent, were positive.

The examinations were divided into several series in accordance with the source of the material. These series included material comprising 3,000 cases from Washington, D. C., and 5 eastern seaboard cities, material from individuals in States in which clinical trichinosis had never been reported, material from persons suffering sudden natural death or traumatic death without hospitalization or hospitalization for less than 24 hours, material selected at random in hospitals selected at random, material from individuals who had lived on farms or in villages of 1,000 population or less, and material from hospitals in the States of Washington and Oregon, as well as the Jewish series mentioned above.

The residence of the individuals represented in the survey embraced 41 States and the District of Columbia. Included were 4,877 cases

in which individuals resided in urban communities and 436 in which the persons came from rural areas.

There were no statistically significant differences in the percentage of positives obtained in the various series or any such difference in the incidence of trichinae in the urban and rural groups.

There have been summarized post-mortem findings of trichinae in various surveys conducted by other workers in the United States. When a correction figure is applied to these findings to make allowance for differences in the techniques employed and the muscles examined, a computed incidence of trichinae of 16.4 percent is obtained in the 6,618 examinations carried out by other investigators. Including data from the present survey, there have been reported in this country a grand total of 11,931 examinations for trichinae, of which our calculations indicate 16.2 percent have been positive. Thus about one of every six persons coming to necropsy over the period represented by these surveys was infected with *Trichinella spiralis.*

Of the 855 positive cases encountered in the total of 5,313, 733, or 85.7 percent, had infections of less than 11 larvae per gram. A total of 4.5 percent of the positive cases had infections of more than 50 larvae per gram. It is believed that infections of this order are capable of causing pronounced clinical symptoms.

Infections with dead larvae predominated over infections with live larvae and infections with live larvae predominated over those with mixed live and dead larvae.

The majority of the infections of over 10 larvae per gram occurred in individuals over 54 years of age.

Data are presented to indicate beyond reasonable doubt that superimposed trichina infections occur in man, that a previous infection does not protect against acquisition of or death from a superimposed infection, and that not all cases of trichinosis are diagnosed either clinically or anatomically.

ACKNOWLEDGMENTS

This study necessitated the assistance of a large number of individuals in various parts of the United States and our success in obtaining material and the essential information relating thereto attests to the splendid cooperation which we received throughout this investigation. While it is not possible to mention all individuals by name, we are grateful to all those physicians who furnished the material for the random and rural series. Dr. David Marine, New York City, cooperated in the Jewish series. The diaphragms in the negative series were supplied for the most part by Dr. R. E. Miller, Dartmouth Medical School, Hanover, N. H., Dr. Hugh Jeter, University of Oklahoma Medical School, Oklahoma City, Okla., and Dr. A. L. Lindberg.

Tucson, Ariz. The Washington State Series was carried on in cooperation with Dr. Donald G. Evans, State Director of Health, and Dr. A. U. Simpson, Director of Laboratories, State Health Department; we are indebted also to Dr. C. R. Jensen, King County Hospital, Seattle, Dr. C. P. Larson, Tacoma General and Pierce County Hospitals, and Dr. C. R. McColl, St. Joseph Hospital, Tacoma, Wash., for their long continued cooperation in furnishing the necropsy material. Acknowledgments for assistance in the base series of examinations have already been made (*5*).

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XIV. A survey of municipal garbage disposal methods as related to the spread of trichinosis. By Willard H. Wright. Pub. Health Rep., **55**: 1069–1077 (June 14, 1940).

INCIDENCE OF HOSPITALIZATION, JULY 1943

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	July 1942	July 1943
1. Number of plans supplying data	66	72
2. Number of persons eligible for hospital care	8,846,262	11,076,738
3. Number of persons admitted for hospital care	91,212	107,693
4. Incidence per 1,000 persons, annual rate, during current month (daily rate×365)	121.3	114.4
5. Incidence per 1,000 persons, annual rate for the 12 months ended July 31	107.5	105.5

DEATHS DURING WEEK ENDED AUGUST 14, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 14, 1943	Corresponding week, 1942
Data from 86 large cities of the United States:		
Total deaths	7,063	6,459
Average for 3 prior years	6,450	
Total deaths, first 32 weeks of year	268,368	243,950
Deaths under 1 year of age	572	510
Average for 3 prior years	461	
Deaths under 1 year of age, first 32 weeks of year	19,422	16,484
Data from industrial insurance companies:		
Policies in force	65,727,142	64,943,314
Number of death claims	10,596	10,188
Death claims per 1,000 policies in force, annual rate	8.4	8.2
Death claims per 1,000 policies, first 32 weeks of year, annual rate	10.1	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 21, 1943

Summary

A total of 747 cases of poliomyelitis was reported currently, as compared with 546 for the preceding week, 183 for the corresponding week last year, and a 5-year (1938–42) median of 343. The number of cases reported currently is the largest number reported for the corresponding week of any year since 1931. An aggregate of 613 cases, or 82 percent of the current total, was reported in 11 States, as follows (last week's figures in parentheses): California, 163 (94); Illinois, 117 (70); Kansas, 76 (89); Texas, 52 (67); Connecticut, 47 (27); New York, 42 (30); Oklahoma, 38 (40); Kentucky, 22 (3); Colorado, 20 (7); Washington, 20 (13); Utah, 16 (9). Increases occurred in 8 of these States and in 15 others, but no other State reported more than 14 cases.

The accumulated total for the first 33 weeks of the year is 4,059, the largest number for the corresponding period of any year since 1934, when the comparable figure was 4,065, or about 56 percent of the total for that year.

A further decline occurred in the incidence of meningococcus meningitis from 185 to 160 cases. The 5-year median for the week is 34. The largest number of cases, 32, was reported in New York (12 in New York City). No other State reported more than 11 cases. The cumulative total for the first 33 weeks of the year is 13,528, as compared with 2,396 for the same period last year and a 5-year median of 1,417.

Cumulative figures for the first 33 weeks of the year for other diseases included in the table (figures for the corresponding period of last year in parentheses) are as follows: Anthrax, 41 (57); diphtheria, 7,265 (7,426); dysentery, all forms, 16,222 (10,588); infectious encephalitis,

428 (321); influenza, 81,667 (80,798); leprosy, 18 (35); measles, 537,131 (466,584); Rocky Mountain spotted fever, 350 (378); scarlet fever, 97,729 (89,173); smallpox, 609 (612); tularemia, 586 (650); typhoid and paratyphoid fever, 3,286 (4,025); endemic typhus fever, 2,202 (1,819); whooping cough, 131,916 (122,382).

A total of 7,543 deaths was recorded for the week in 88 large cities of the United States, as compared with 7,812 for the preceding week and a 3-year (1940–42) average of 7,141. The cumulative total for the first 33 weeks of the year is 302,827, as compared with 276,643 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended Aug. 21, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Aug. 21, 1943	Aug. 22, 1942		Aug. 21, 1943	Aug. 22, 1942		Aug. 21, 1943	Aug. 22, 1942		Aug. 21, 1943	Aug. 22, 1942	
NEW ENGLAND												
Maine	0	0	0	------	------	------	8	72	15	3	0	0
New Hampshire	0	0	0	------	------	------	3	0	0	1	0	0
Vermont	0	0	0	------	------	------	25	11	11	0	0	0
Massachusetts	0	2	2	------	------	------	55	62	65	6	2	1
Rhode Island	0	0	0	------	------	------	12	4	6	1	0	0
Connecticut	0	0	0	------	3	1	15	10	11	1	0	0
MIDDLE ATLANTIC												
New York	8	4	9	[1] 2	[1] 7	[1] 6	258	60	134	32	7	7
New Jersey	1	2	3	1	1	2	74	36	36	3	2	0
Pennsylvania	7	6	6	------	------	------	35	31	51	6	3	3
EAST NORTH CENTRAL												
Ohio	6	3	3	2	1	1	69	16	15	6	0	0
Indiana	12	7	5	3	3	3	9	5	5	1	1	0
Illinois	13	19	12	4	3	2	49	7	20	10	1	1
Michigan [2]	4	1	4	------	1	1	251	37	39	9	3	1
Wisconsin	2	0	0	10	12	11	203	78	84	3	0	0
WEST NORTH CENTRAL												
Minnesota	4	1	1	1	------	1	24	8	8	0	0	0
Iowa	1	3	3	------	------	------	2	15	15	3	2	2
Missouri	0	8	8	1	------	------	7	18	8	2	0	0
North Dakota	4	0	0	4	------	5	8	7	7	1	1	0
South Dakota	0	0	0	------	------	------	4	2	1	1	0	0
Nebraska	3	0	1	3	6	------	4	19	2	0	0	0
Kansas	2	1	2	------	1	------	9	6	7	5	0	0
SOUTH ATLANTIC												
Delaware	1	0	0	------	------	------	1	0	0	2	0	0
Maryland [2]	2	4	4	1	1	1	17	9	6	11	3	1
District of Columbia	0	1	1	------	------	------	6	4	4	2	2	0
Virginia	2	8	8	58	43	42	43	8	33	8	1	1
West Virginia	5	2	6	1	------	11	6	2	3	1	0	0
North Carolina	17	10	13	2	------	------	9	2	5	3	1	1
South Carolina	14	19	5	118	104	104	2	5	3	1	0	0
Georgia	13	11	12	10	8	7	9	3	4	3	0	0
Florida	1	2	2	5	1	1	3	2	2	4	3	0
EAST SOUTH CENTRAL												
Kentucky	2	4	6	1	------	1	11	3	5	0	1	1
Tennessee	5	2	6	2	9	13	7	1	5	2	0	1
Alabama	10	7	9	17	11	11	8	9	7	3	1	0
Mississippi [2]	5	8	8	------	------	------	------	------	------	1	1	1
WEST SOUTH CENTRAL												
Arkansas	4	2	5	5	2	4	2	1	9	1	1	0
Louisiana	10	8	8	8	8	4	22	3	3	2	1	1
Oklahoma	3	0	3	17	11	11	2	------	3	1	0	0
Texas	23	25	25	175	105	105	43	25	25	2	0	2
MOUNTAIN												
Montana	1	0	0	------	1	2	21	11	10	1	0	0
Idaho	0	0	0	------	------	------	17	7	2	0	0	0
Wyoming	1	0	1	2	7	------	9	5	5	0	0	0
Colorado	3	1	4	11	16	4	13	11	5	1	1	1
New Mexico	1	1	0	------	------	------	0	2	4	0	0	0
Arizona	1	2	2	22	20	9	12	3	3	2	0	0
Utah [2]	0	0	0	------	------	------	10	31	13	0	0	0
Nevada	1	0	------	------	------	------	0	0	------	0	0	------
PACIFIC												
Washington	3	1	1	------	1	------	14	54	20	3	0	0
Oregon	8	0	0	------	6	5	12	34	11	2	2	0
California	9	10	10	20	15	14	110	65	81	10	2	1
Total	212	185	185	506	407	407	1,533	804	939	160	42	34
33 weeks	7,265	7,426	8,865	81,667	80,798	151,650	537,131	466,584	466,584	13,528	2,396	1,417

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Aug. 21, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Aug. 21, 1943	Aug. 22, 1942		Aug. 21, 1943	Aug. 22, 1942		Aug. 21, 1943	Aug. 22, 1942		Aug. 21, 1943	Aug. 22, 1942	
NEW ENGLAND												
Maine	0	0	0	2	4	2	0	0	0	0	0	0
New Hampshire	0	1	0	2	0	1	0	0	0	0	0	0
Vermont	0	0	0	2	0	1	0	0	0	1	0	0
Massachusetts	7	0	3	66	63	34	0	0	0	11	6	3
Rhode Island	8	0	0	2	4	1	0	0	0	0	0	1
Connecticut	47	2	3	6	7	5	0	0	0	1	3	1
MIDDLE ATLANTIC												
New York	42	15	15	66	36	50	0	0	0	7	12	12
New Jersey	0	12	12	11	18	20	0	0	0	6	8	8
Pennsylvania	4	5	5	26	32	42	0	0	0	6	14	14
EAST NORTH CENTRAL												
Ohio	14	11	11	63	32	34	0	0	0	5	8	11
Indiana	1	5	5	8	13	14	0	0	1	2	6	7
Illinois	117	27	13	35	43	45	1	0	2	3	4	11
Michigan [2]	11	12	16	32	26	37	0	1	1	10	1	7
Wisconsin	1	0	1	30	37	34	0	0	0	2	0	0
WEST NORTH CENTRAL												
Minnesota	14	3	5	12	16	17	0	0	0	0	0	0
Iowa	8	7	5	10	9	9	0	0	1	1	1	3
Missouri	14	8	4	7	19	11	0	1	1	5	10	22
North Dakota	1	0	0	4	1	2	0	0	0	0	0	0
South Dakota	0	0	0	6	2	4	0	0	0	0	0	0
Nebraska	5	12	1	2	2	2	0	0	0	0	3	1
Kansas	76	3	3	20	21	21	0	0	0	5	2	3
SOUTH ATLANTIC												
Delaware	0	2	2	2	0	0	0	0	0	0	1	1
Maryland [2]	0	0	1	8	6	7	0	0	0	1	2	5
District of Columbia	0	0	3	4	12	5	0	0	0	1	0	1
Virginia	4	0	1	12	9	7	0	0	0	10	9	9
West Virginia	1	5	1	21	18	13	0	0	0	7	1	15
North Carolina	1	8	7	27	22	21	0	0	0	1	1	13
South Carolina	1	1	1	8	5	4	0	0	0	8	2	14
Georgia	0	0	1	14	6	8	0	0	0	10	21	24
Florida	0	2	2	2	0	0	0	0	0	4	10	1
EAST SOUTH CENTRAL												
Kentucky	22	10	10	6	22	21	0	0	0	22	17	23
Tennessee	2	5	3	8	31	19	0	0	0	9	6	21
Alabama	2	1	3	7	12	12	0	0	0	5	2	13
Mississippi [2]	3	1	1	10	12	4	0	0	0	6	5	7
WEST SOUTH CENTRAL												
Arkansas	8	6	2	6	6	6	0	0	0	8	11	14
Louisiana	6	3	3	5	1	5	0	0	0	8	12	15
Oklahoma	38	2	1	5	8	5	1	0	0	3	6	17
Texas	52	3	3	11	23	18	0	1	0	13	18	35
MOUNTAIN												
Montana	0	0	0	4	4	8	0	0	0	1	0	0
Idaho	1	0	0	182	0	1	0	0	0	0	0	1
Wyoming	0	0	0	1	4	0	0	0	0	0	0	0
Colorado	20	0	0	11	11	10	0	0	0	0	2	2
New Mexico	1	1	1	0	2	2	0	0	0	2	1	3
Arizona	5	0	0	3	1	1	0	0	0	1	2	2
Utah [2]	16	0	0	10	2	3	0	0	0	0	0	0
Nevada	0	0	-----	0	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	20	1	1	18	5	8	0	0	0	1	3	4
Oregon	11	0	2	14	2	5	0	0	0	2	2	2
California	163	9	11	52	37	47	0	0	0	8	0	9
Total	747	183	343	863	641	641	2	3	12	196	212	401
33 weeks	4,059	1,505	2,072	97,729	89,173	116,482	609	612	1,958	3,286	4,025	4,993

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Aug. 21, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended Aug. 21, 1943	Whooping cough: Week ended Aug. 22, 1942	Whooping cough: Median 1938–42	Week ended Aug. 21, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	14	27	27	0	0	0	0	0	0	0	0	0
New Hampshire	0	7	0	0	0	0	0	0	0	0	0	0
Vermont	12	49	21	0	0	0	0	0	0	0	0	0
Massachusetts	50	139	139	0	0	2	0	0	0	0	0	0
Rhode Island	17	12	13	0	0	0	0	0	0	0	0	0
Connecticut	23	61	42	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	241	358	358	0	1	6	0	2	0	4	0	0
New Jersey	132	184	146	0	1	0	0	1	0	1	0	0
Pennsylvania	226	267	303	1	1	1	0	0	0	1	0	0
E. NO. CEN.												
Ohio	158	158	158	0	0	0	0	1	0	0	0	0
Indiana	32	50	15	0	0	0	0	0	0	0	0	0
Illinois	194	320	268	0	0	0	0	3	0	3	0	0
Michigan [2]	252	268	268	0	1	2	0	0	0	0	0	0
Wisconsin	312	216	214	0	0	0	0	0	0	0	0	0
W. NO. CEN.												
Minnesota	76	50	50	0	3	0	0	1	0	0	0	0
Iowa	27	26	20	0	0	0	0	0	0	0	0	0
Missouri	33	17	17	0	0	0	4	0	0	0	0	0
North Dakota	13	3	22	0	0	0	0	0	0	0	0	0
South Dakota	38	1	3	0	0	0	0	0	0	0	0	0
Nebraska	6	2	8	0	0	0	0	0	0	0	0	0
Kansas	47	21	44	0	0	0	0	0	0	0	0	1
SOUTH ATLANTIC												
Delaware	5	1	4	0	0	0	0	0	0	0	0	0
Maryland [2]	80	57	56	0	0	0	7	1	0	3	0	0
District of Columbia	17	26	12	0	0	0	0	0	0	0	0	0
Virginia	61	21	43	0	0	0	279	0	0	2	0	1
West Virginia	27	6	20	0	0	0	0	0	0	0	0	0
North Carolina	143	92	92	0	0	1	0	0	0	1	0	3
South Carolina	90	53	27	0	0	7	0	0	0	0	0	1
Georgia	9	13	19	0	1	8	1	0	0	0	0	46
Florida	33	18	16	0	3	0	0	0	0	0	0	4
E. SO. CEN.												
Kentucky	25	42	46	0	0	0	3	0	0	0	0	0
Tennessee	58	24	50	0	0	0	3	0	0	1	1	1
Alabama	50	22	22	0	0	0	0	0	0	0	0	27
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	6
W. SO. CEN.												
Arkansas	23	9	9	0	1	29	0	0	0	0	1	1
Louisiana	4	6	10	0	2	3	0	0	0	0	0	6
Oklahoma	2	11	11	0	0	0	0	0	0	2	0	0
Texas	166	126	126	0	27	487	0	11	0	0	1	50
MOUNTAIN												
Montana	31	22	22	0	0	0	0	0	0	0	1	0
Idaho	0	2	2	0	0	0	0	0	0	0	0	0
Wyoming	0	5	4	0	0	0	0	0	0	0	4	0
Colorado	40	25	25	0	0	18	0	1	0	0	3	0
New Mexico	6	14	29	0	0	2	4	0	0	0	0	0
Arizona	11	7	24	0	0	0	27	0	0	0	0	0
Utah [2]	45	9	48	0	0	0	0	1	0	0	0	0
Nevada	1	0	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	42	24	27	0	0	0	0	1	0	0	0	0
Oregon	55	22	22	0	0	0	0	0	0	0	0	0
California	125	170	185	0	0	6	0	7	0	0	0	1
Total	3,052	3,063	3,295	1	41	573	328	30	0	18	11	148
33 weeks	131,916	122,382	126,631	41	1,351	10,255	4,616	428	18	350	586	2,202
33 weeks, 1942	------	------	------	57	697	5,591	4,300	321	35	378	650	1,819

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 10; Connecticut, 1; New Jersey, 1; Virginia, 1; South Carolina, 2; Georgia, 1; Tennessee, 1; Louisiana, 1; Texas, 1; California, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 7, 1943

This table lists the reports from 85 cities of more than 10,000 population distributed throughout the United States and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	8	0	1	0	0	0	0	2
New Hampshire:												
Concord	0	0	------	1	0	0	0	0	1	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	1	0	0	0
Massachusetts:												
Boston	0	0	------	0	12	7	12	0	16	0	0	29
Fall River	0	0	------	0	0	0	0	0	0	0	0	3
Springfield	0	0	------	0	5	0	0	0	3	0	0	1
Worcester	0	0	------	0	3	0	1	0	2	0	0	6
Rhode Island:												
Providence	0	0	------	0	40	0	1	4	2	0	1	34
Connecticut:												
Bridgeport	0	0	------	0	0	1	0	0	0	0	0	0
Hartford	0	0	1	1	1	0	0	0	1	0	0	4
New Haven	0	0	------	0	10	1	0	10	2	0	0	12
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	0	2	4	0	5	0	1	6
New York	4	1	2	0	169	16	33	11	34	0	5	78
Rochester	0	0	------	0	4	0	0	0	1	0	1	9
Syracuse	0	0	------	0	0	0	1	0	0	0	0	12
New Jersey:												
Camden	0	0	------	0	0	0	0	0	0	0	2	3
Newark	0	0	3	0	14	1	2	0	0	0	0	32
Trenton	0	0	------	0	1	0	0	0	1	0	0	1
Pennsylvania:												
Philadelphia	1	0	------	0	3	9	20	0	9	0	2	58
Pittsburgh	3	0	------	0	10	2	13	1	4	0	0	32
Reading	0	0	------	0	1	0	0	0	0	0	0	3
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	3	0	1	0	1	0	0	5
Cleveland	1	0	2	0	3	1	1	0	14	0	1	43
Columbus	0	0	------	0	10	0	1	0	3	0	0	17
Indiana:												
Fort Wayne	1	0	------	0	5	0	1	0	0	0	0	0
Indianapolis	0	0	------	0	3	0	1	0	2	0	0	17
South Bend	0	0	------	0	1	0	0	0	1	0	0	1
Terre Haute	0	0	------	0	0	0	1	0	1	0	0	0
Illinois:												
Chicago	4	0	------	0	37	10	7	26	6	0	0	88
Springfield	0	0	------	0	0	0	1	0	0	0	0	0
Michigan:												
Detroit	1	0	------	0	43	3	7	1	6	0	2	66
Flint	0	0	------	0	0	0	0	0	0	0	0	6
Grand Rapids	0	0	------	0	22	0	0	0	0	0	0	15
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	2	0	0	2
Milwaukee	0	1	------	0	25	0	0	1	9	0	0	103
Racine	0	0	------	0	1	0	1	0	2	0	0	4
Superior	0	0	------	0	10	0	0	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	10	0	1	0	1	0	0	9
Minneapolis	1	0	------	0	3	1	2	2	1	0	0	6
St. Paul	1	0	------	0	6	1	2	3	1	0	0	46

City reports for week ended Aug. 7, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENTRAL—continued												
Missouri:												
Kansas City	0	0	—	0	4	0	6	7	2	0	0	6
St. Joseph	0	0	—	0	1	1	0	0	1	0	0	11
St. Louis	0	0	—	0	7	1	8	0	6	0	2	25
North Dakota:												
Fargo	0	0	—	0	7	0	0	0	0	0	0	4
Nebraska:												
Omaha	0	0	—	0	0	0	1	3	3	0	0	0
Kansas:												
Topeka	0	0	—	0	1	0	2	3	0	0	0	0
Wichita	0	0	—	0	1	2	0	11	0	0	0	4
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	—	0	2	0	0	0	1	0	0	0
Maryland:												
Baltimore	0	0	1	0	25	3	11	0	4	0	0	96
Cumberland	0	0	—	0	0	0	0	0	0	0	0	0
Frederick	0	0	—	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	1	0	—	0	22	0	3	0	4	0	0	28
Virginia:												
Lynchburg	0	0	—	0	25	1	1	0	0	0	1	12
Richmond	0	0	—	0	4	4	0	1	1	0	0	3
Roanoke	0	0	—	0	1	0	0	0	0	0	0	0
West Virginia:												
Wheeling	0	0	—	0	0	1	0	0	0	0	0	15
North Carolina:												
Winston-Salem	1	0	—	0	0	0	0	0	0	0	0	12
South Carolina:												
Charleston	0	0	3	0	0	0	1	0	1	0	0	2
Georgia:												
Atlanta	2	0	9	0	0	0	2	0	2	0	0	1
Brunswick	0	0	—	0	0	0	1	0	0	0	0	0
Savannah	0	0	—	0	0	1	0	0	0	0	0	0
Florida:												
Tampa	0	0	—	0	0	0	4	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	—	0	0	0	1	0	1	0	0	20
Nashville	0	0	—	0	1	0	4	0	3	0	0	3
Alabama:												
Birmingham	0	0	—	0	1	1	2	1	3	0	2	5
Mobile	0	0	—	0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	—	0	0	0	3	0	0	0	0	0
Louisiana:												
New Orleans	0	0	1	1	0	1	8	2	1	0	0	3
Shreveport	0	0	—	0	0	0	3	4	0	0	2	0
Texas:												
Dallas	0	0	—	0	3	0	1	3	1	0	1	4
Galveston	0	0	—	0	0	0	2	1	0	0	0	5
Houston	1	1	—	0	0	0	5	4	1	0	0	7
San Antonio	0	1	—	0	80	0	6	0	0	0	0	1
MOUNTAIN												
Montana:												
Billings	1	0	—	0	2	0	0	0	0	0	0	0
Helena	0	0	—	0	0	0	1	0	0	0	0	0
Missoula	0	0	—	0	0	0	0	0	1	0	0	0
Idaho:												
Boise	0	0	—	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	0	0	3	0	2	0	4	1	3	0	0	35
Pueblo	0	0	—	0	0	0	1	0	1	0	0	4

City reports for week ended Aug. 7, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	2	0		0	8	2	4	3	0	0	0	12
Spokane	0	0		0	4	0	0	0	9	0	0	6
Tacoma	0	0		0	1	0	0	0	0	0	0	0
California:												
Los Angeles	2	0	4	0	18	4	5	12	10	0	0	39
Sacramento	1	1		0	0	1	1	3	2	0	0	1
San Francisco	0	0		0	8	2	7	9	3	0	2	4
Total	29	5	29	4	691	80	214	127	197	0	25	1,121
Corresponding week, 1942	43	6	25	5	266	29	231	23	225	2	33	1,235
Average, 1938–42	54		28	[1] 6	[2] 400		[1] 233		208	2	47	1,355

Dysentery, amebic.—Cases: New York, 2.

Dysentery, bacillary.—Cases: New York, 6; Syracuse, 1; Chicago, 1; Detroit, 3; St. Louis, 1; Richmond, 3; Charleston, S. C., 25; Atlanta, 2; Nashville, 4; Galveston, 1; Los Angeles, 7.

Dysentery, unspecified—Cases: Baltimore, 2; Washington, 1; Richmond, 4; Dallas, 1; San Antonio, 8.

Rocky Mountain spotted fever.—Cases: Lynchburg, 1; Richmond, 5; Nashville, 1.

Typhus fever.—Cases: New York, 3; Charleston, S. C., 2; Atlanta, 2; Savannah, 3; Mobile, 4; New Orleans, 3; Dallas, 2; Houston, 2.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 85 cities in the preceding table (estimated population, 1942, 34,430,900)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	0.0	0.0	2.5	5.0	196	22.4	37.3	34.8	69.6	0.0	2.5	226
Middle Atlantic	3.6	.4	2.2	0	90	13.4	32.6	5.4	24.1	0	4.9	104
East North Central	4.7	.6	1.2	.6	95	8.2	12.8	16.4	28.0	0	1.8	214
West North Central	3.9	0	0	0	78	11.7	43.0	56.7	29.3	0	3.9	217
South Atlantic	7.1	0	23.1	0	140	17.7	40.5	1.8	23.1	0	1.8	300
East South Central	0	0	0	0	12	5.9	47.5	5.9	41.6	0	11.9	166
West South Central	2.9	5.9	2.9	2.9	243	2.9	82.1	41.1	8.8	0	8.8	59
Mountain	11.2	0	33.6	0	45	0	67.3	11.2	56.1	0	0	437
Pacific	8.7	1.7	7.0	0	68	15.7	29.7	47.2	41.9	0	3.5	108
Total	4.4	.8	4.4	.6	105	12.1	32.4	19.2	29.8	0	3.8	170

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—Up to August 20, 1943, a total of 76 cases of dengue fever among civilians has been reported in Honolulu, T. H. All control measures are being taken. (See also p. 1290 of the Public Health Reports of August 20, 1943.)

Panama Canal Zone

Notifiable diseases—June 1943.—During the month of June 1943, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	7		4		2				13	
Diphtheria	10	1	1				1		12	1
Dysentery (amebic)	3				2		6	1	11	1
Dysentery (bacillary)			1		1		1	1	3	1
Leprosy	1						1		2	
Malaria [1]	19	1	2	1	204		83	1	308	3
Measles	1				8				9	
Meningitis, meningococcus			1						1	
Mumps	57		5		37		6		105	
Paratyphoid fever	[2] 3						2		[2] 5	
Pneumonia		11		5	15			4	[3] 15	20
Tuberculosis		12		4	5	1		10	[3] 5	27
Typhoid fever							2		2	

[1] 81 recurrent cases.
[2] Includes 1 carrier.
[3] Cases reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 24, 1943.—During the week ended July 24, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		16	1	31	130	15	24	30	21	268
Diphtheria		13	2	16	4	5				40
Dysentery (bacillary)				3						3
Encephalitis, infectious									1	1
German measles				4	20	3		9	11	47
Influenza			3	3	6				2	14
Measles		18	2	121	417	52	13	136	55	814
Meningitis, meningococcus				2	3	1			2	8
Mumps		36		14	82	22	1	12	33	200
Poliomyelitis					1					1
Scarlet fever		1	4	41	39	11	11	24	15	146
Tuberculosis (all forms)	12	2	2	84	57	10		2	29	198
Typhoid and paratyphoid fever			1	3		1	2		2	9
Undulant fever					1					1
Whooping cough		2		171	127	14	37	44	25	420

CUBA

Provinces—Notifiable diseases—4 weeks ended July 17, 1943.—During the 4 weeks ended July 17, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			2	14		14	30
Chickenpox		1		1			2
Diphtheria	1	32	2	1	2	2	40
Hookworm disease		31					31
Leprosy		9		1	1	2	13
Malaria	33	11	14	23	10	110	201
Measles		10	3				13
Meningitis, meningococcus	1						1
Poliomyelitis	2	1		1		4	8
Rabies				1			1
Scarlet fever		4					4
Tuberculosis	20	21	23	30	3	48	145
Typhoid fever	13	90	29	199	41	33	405
Whooping cough	2		1	2		1	6

[1] Includes the city of Habana.

JAMAICA

Notifiable diseases—4 weeks ended July 31, 1943.—During the 4 weeks ended July 31, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	6	17	Puerperal fever		1
Diphtheria	3	3	Tuberculosis	35	85
Dysentery	4	2	Typhoid fever	15	51
Erysipelas	1		Typhus fever		1
Leprosy		5			

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–May 1943	June 1943	July 1943—week ended—				
				3	10	17	24	31
ASIA								
Ceylon	C	48	2					
India	C	89, 135	11, 783	6, 883				
Bombay	C		3					
Calcutta	C	1, 367	669	314	334			
Cochin.[1]								
Madras	C	964						
Negapatam	C		6	15				
Vizagapatam	C	4						
India (French)	C	49						
Chandernagor	C	4						
Karikal	C	28						
Pondichery	C	17						

[1] Information dated Aug. 17, 1943, states that cholera is present in epidemic form in the port of Cochin and vicinity.

PLAGUE

[C indicates cases; D, deaths; P, present]

AFRICA								
Basutoland [1]	C	11	P					
Belgian Congo—Plague-infected rats		P						
British East Africa:								
Kenya	C	11						
Uganda	C	8	5		1			
Madagascar	C	17						
Morocco (French)	C	198	27					
Senegal	C	72	71		22			
Dakar	C		18		8			
Union of South Africa	C	53						
ASIA								
India	C	1, 209	45	57				
Indochina	C	12	3		3			
Palestine	C	8	3	1				

[1] For the period June 12–30, 1943, pneumonic plague occurred in a village near Mafeteng, Basutoland, all cases being fatal.

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January-May 1943	June 1943	July 1943—week ended—				
				3	10	17	24	31
SOUTH AMERICA								
Peru:								
Lambayeque Department	C	2						
Libertad Department	C	15						
Lima Department	C	3						
Lima	C	1						
Plague-infected rats		P						
Piura Department	C	2						
Venezuela	C					[2] 7		
OCEANIA								
Hawaii Territory:								
Hamakua District	D	4						
Plague-infected rats		[3] 64	2		1	1		1

[2] For the period July 1-14, 1943.
[3] Includes 3 plague-infected mice.

SMALLPOX

[C indicates cases; D, deaths]

Place		January-May 1943	June 1943	3	10	17	24	31
AFRICA								
Algeria	C	573	148					
Angola	C	517						
Basutoland	C	38						
Belgian Congo	C	1, 187	300	94				
British East Africa:								
Kenya	C		20	2	86			
Mombasa	C	3						
Tanganyika	C	11						
Dahomey	C	129	6					
Egypt	C	531	555	173	134	99		
French Guinea	C	126	1		2			
Gold Coast	C	5						
Ivory Coast	C	101	25		1			
Mauritania	C	1			6			
Morocco (French)	C	679	28					
Mozambique	C	1						
Nigeria	C	2, 975	588	110	176	124		
Niger Territory	C	156	4		2			
Senegal	C	27	30		1			
Sierra Leone	C	3						
Sudan (French)	C	1, 538	546		572			
Union of South Africa	C	221	3					
ASIA								
Ceylon	C	1	1					
India	C	14, 468	4, 464	1, 416	224			
India (French)	C	10						
Indochina	C	3, 358	318		83			
Iran	C	217	59					
Iraq	C	178		6				
Palestine	C	29						
Syria and Lebanon	C	764	32	18	19			
Trans-Jordan	C	11						
EUROPE								
Belgium	C	1						
France	C	1	1					
Germany	C	1						
Scotland	C	1						
Portugal	C	23	11	2	1			
Spain	C	159	25					
Switzerland	C	5	2					
Turkey	C	5, 625						
NORTH AMERICA								
Canada	C	1			1	2		
Guatemala	C	4	1					
Mexico	C	110	56					
SOUTH AMERICA								
Brazil	C	40						
British Guiana	C		1					
Colombia	C	130	41					
Ecuador	C	10						
Peru	D	9						
Venezuela	C	27	7					

TYPHUS FEVER

[C indicates cases]

Place		January–May 1943	June 1943	July 1943—week ended— 3	10	17	24	31
AFRICA								
Algeria	C	6,824	630		141			
Belgian Congo	C	2		2				
British East Africa:								
Kenya	C	5	1					
Mombasa	C	1						
Uganda	C	1						
Egypt	C	29,161	5,308	988	918	754		
Gold Coast	C	4	2					
Morocco (French)	C	11,612	1,225					
Morocco (Spanish)	C	62	1					
Nigeria	C	8	1	1				
Rhodesia, northern	C	4						
Senegal	C	2						
Sierra Leone	C	3						
Union of South Africa	C	778	1					
ASIA								
Afghanistan	C	520						
China: Shanghai	C	12						
India	C	1,011	38	5				
Iran	C	7,447	910					
Iraq	C	1,240	135	20	10	8		
Palestine	C	157	41	12	4			
Syria and Lebanon	C	23	25	14	2			
Trans-Jordan	C	12						
EUROPE								
Bulgaria	C	[1] 1,250						
France—Seine Department	C	2						
Germany	C	[2] 800						
Hungary	C	596	62	8	7	10		3
Irish Free State	C	19						
Portugal	C	5					2	
Rumania	C	5,585	677					[3] 403
Slovakia	C	255	70		9	14	11	
Spain	C	404	89	3				
Turkey	C	2,549						
NORTH AMERICA								
Guatemala	C	441	96					
Jamaica	C	11	1					
Mexico	C	654	60					
Puerto Rico	C	2						
SOUTH AMERICA								
Chile	C	130	21	4	2			
Ecuador	C	144	18					
Peru	C	7	1					
Venezuela	C	8	2					
OCEANIA								
Australia	C	52	11		2	1		
Hawaii Territory	C	10	1					

[1] For the period Jan. 1 to July 14, 1943.
[2] For the first 7 weeks of 1943.
[3] For the month of July.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January–May 1943	June 1943	July 1943—week ended— 3	10	17	24	31
AFRICA								
Belgian Congo:								
Bondo	D	1						
Leopoldville	C	1						
Stanleyville	D	1						
Yanonge	C	1						
Sierra Leone: Freetown	C		[1] 1					
SOUTH AMERICA								
Colombia:								
Cundinamarca Department	D	1	2					
Intendencia of Meta	D	2						

[1] Suspected.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

Vol. 58 • SEPTEMBER 3, 1943 • *No. 36*

THE PATIENT LOAD OF PHYSICIANS IN PRIVATE PRACTICE

A COMPARATIVE STATISTICAL STUDY OF THREE AREAS[1]

By ANTONIO CIOCCO, *Senior Statistician*, and ISIDORE ALTMAN, *Associate Statistician*, *United States Public Health Service*

INTRODUCTION

Statistics on the patient load of private medical practitioners in Maryland and the District of Columbia have already been presented.[2] Similar data for the State of Georgia now make possible comparisons from which more definitive conclusions about the significance of the findings may be drawn.

It is known that the three areas differ in social and economic characteristics. In addition, they differ with respect to available medical facilities. Before the wholesale entry of physicians into the armed forces was begun, the District of Columbia had a ratio of 570 persons per physician, the ratio in Maryland was 940 persons, while in Georgia it was 1,380 persons per physician. At the time the studies here described were made,[3] the number of persons per physician in the District of Columbia, Maryland, and Georgia had increased to 840, 1,190, and 1,760, respectively.

MATERIAL

The questionnaires used in obtaining information from the physicians are reproduced in the appendix. Modifications were made in

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[1] From the Division of Public Health Methods, National Institute of Health. A study carried out for the Committee on the Allocation of Medical Personnel of the Procurement and Assignment Service.

Dr. F. X. McGovern, former chairman of the District of Columbia Procurement and Assignment Service, Mr. Theodore Wiprud, executive secretary of the Medical Society of the District of Columbia, Dr. C. W. Maxson, chairman of the Maryland Procurement and Assignment Service, and Dr. W. A. Selman, chairman of the Georgia Procurement and Assignment Service, cooperated in these studies.

[2] Ciocco, Antonio, and Altman, Isidore: Statistics on the patient load of physicians in private practice. J. Am. Med. Assoc., 121: 506-513 (Feb. 13. 1943).

[3] Physicians in the study areas were asked to state their patient loads for the following weeks in 1942: District of Columbia, August 30-September 5; Maryland, October 5-October 10; Georgia, December 13-December 19.

the schedule as experience was gained in successive studies. The number of physicians in private practice to whom the questionnaires were sent and the number and percentage of replies received are shown in the following brief table:

	Questionnaires sent	*Questionnaires returned*	*Percentage returned*
District of Columbia	991	597	60
Maryland	1, 623	1, 065	66
Georgia	1, 777	1, 013	57

In each of the areas studied, a comparison between the physicians who replied and those who did not reveals little difference with respect to age, sex, specialty, and place of practice; and it can be safely presumed that the physicians who replied are fairly representative of all the physicians in the areas studied.

WEEKLY PATIENT LOAD OF GENERAL PRACTITIONERS

The term "general practitioners" as here employed includes all physicians except those whose practice is designated as being *limited* to a special field of medical practice.[4]

For each of the three areas studied, the distribution of the white male general practitioners according to number of patients seen in 1 week is shown in figures 1*a* and 1*b*; the means and standard deviations of the distribution are presented in table 1, and in detail by age group in appendix table 1. For Maryland, the data are given separately for Baltimore City and the 23 counties. For Georgia, the 6 counties in which are located cities of 50,000 or more persons have been grouped together and hereafter will be called the urban counties. These 6 counties are Fulton and DeKalb (Atlanta), Bibb (Macon), Chatham (Savannah), Muscogee (Columbus), and Richmond (Augusta). The remaining 153 counties of Georgia are treated as one group, which for the sake of simplicity will be termed rural.

A glance at figures 1*a* and 1*b* reveals the isomorphism of all the distributions illustrated. The peak, i. e., the highest number of physicians, is at 40–80 patients for all the areas compared; and the dispersion of the distribution is also the same in all the areas. In Georgia the average weekly patient load equals 112 for the urban physicians and 111 for the rural. The averages are slightly lower than those observed in Washington and Baltimore, and quite a bit lower than that of the Maryland counties.

The values of the standard deviation are also slightly smaller for the Georgia physicians, but not significantly so. These values indicate that in the samples studied the total patient load of two-

[4] For the District of Columbia sample, the records of the medical society were utilized for this information. For the Maryland and Georgia samples, the information reported in the 1942 Directory of the American Medical Association was used.

thirds of the general practitioners varies between 30 and 200 patients weekly, and the office patient load varies from 20 to 150 patients.

From table 1 it may be seen that general practitioners see the bulk of their patients in the office. A comparison of the five locales reveals that the proportion of office patients to all patients is almost

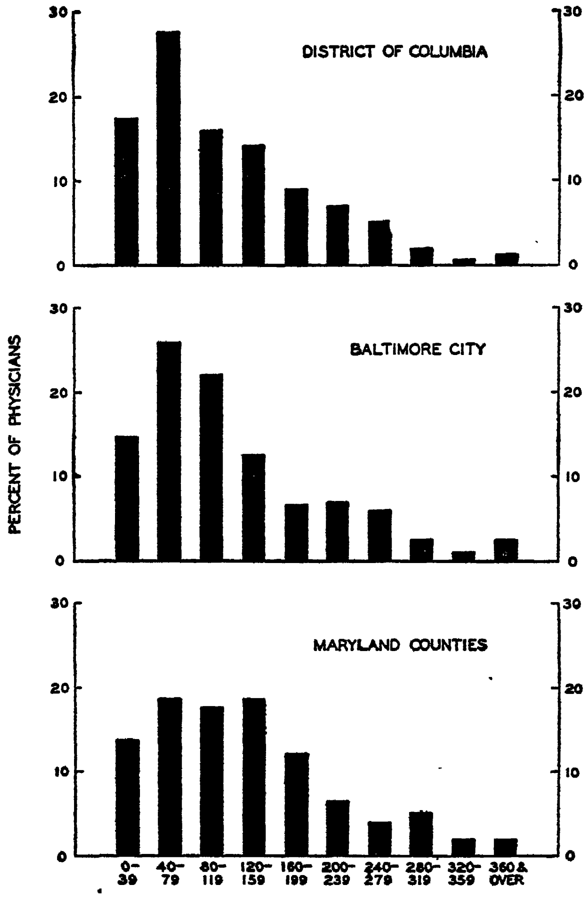

FIGURE 1a.—Patients seen in 1 week by white male general practitioners in the District of Columbia and Maryland.

the same in each. Of the total average weekly patient load the percentage seen in the office was as follows:

	Percentage
District of Columbia	75
Baltimore	69
Maryland counties	73
Georgia counties:	
Urban	70
Rural	71

TABLE 1.—*Average weekly patient load of white male general practitioners, by place of practice*

Place of practice	Number of physicians giving information	Weekly patient load					
		Averages				Standard deviations	
		Office	Hospital	Home of patient	Total	Office	Total
District of Columbia	156	86	8	21	115	68	84
Maryland:							
Baltimore	288	82	6	31	119	64	88
Exclusive of Baltimore City	262	96	7	29	132	71	88
Total	550	89	7	30	126	68	88
Georgia:							
Urban	170	78	11	23	112	53	73
Rural	436	79	6	26	111	59	77
Total	606	79	7	25	111	57	76

The proportion of patients seen in the office by Baltimore physicians is the lowest, but it is only 6 percent lower than the highest proportion, that seen by the District of Columbia general practitioners.

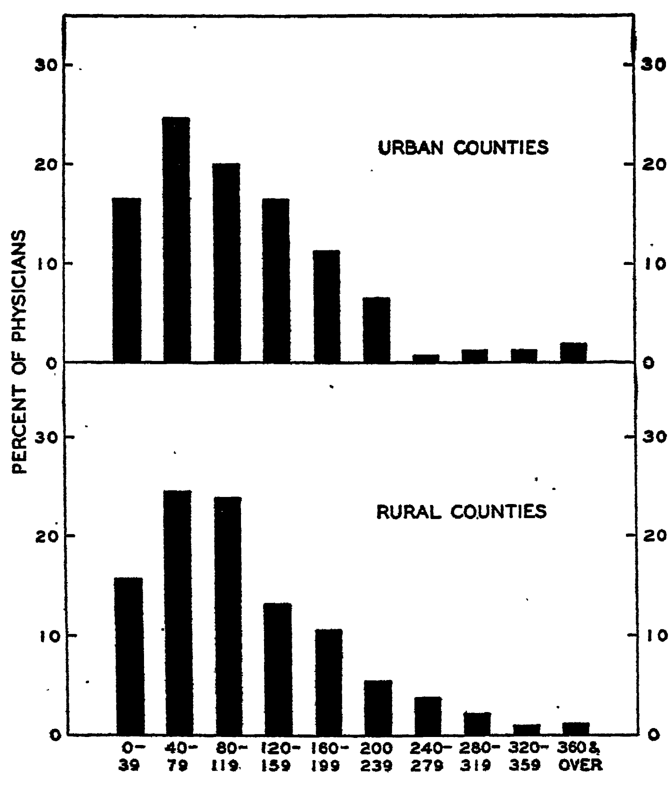

FIGURE 1b.—Patients seen in 1 week by white male general practitioners in Georgia.

AGE AND PATIENT LOAD

The average patient load of physicians varies markedly from age group to age group. Figure 2 (cf. also appendix table 1) brings out in a striking manner the uniformity in the direction and degree of the age trend. Physicians apparently achieve their peak of activity (in terms of number of patients) between the ages of 35 and 44. The general practitioners under 35 years of age demonstrate on the whole a slightly lower average, but nevertheless one that is higher than the average for the ages 45 and above.

Physicians 65 years and older show the lowest patient load, from one-third to one-half that of the men between 35 and 44 years. The fraction would be even smaller if all the physicians over 65 years who see any patients at all were to be included in the tally. But the tabulation has been limited to physicians ostensibly in active practice, and physicians who indicated that they were quasi retired

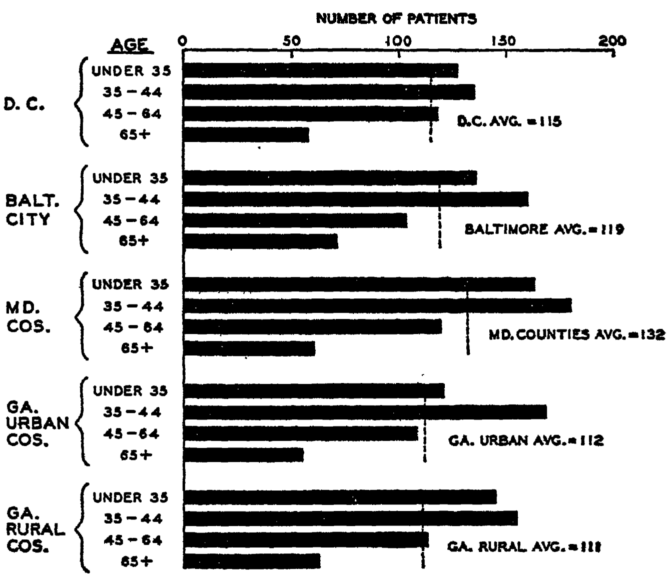

FIGURE 2.—Average number of patients seen in 1 week by white male general practitioners in different age groups.

or about to retire, although still seeing one or two patients, have been excluded. On the other hand, findings for this age group do not imply that every physician 65 years and older is only one-third or one-half as effective as his younger colleagues. Many of the older men carry a very full and more active practice than younger ones, as is apparent from the values of the standard deviation in the patient load of the oldest age group (appendix table 1).

The close resemblance of the results for the several areas so widely divergent from many standpoints, permits combining the

values to reveal even more effectively the pattern of the trend. Figure 3 illustrates graphically the results of pooling the data. The findings on the practitioners of Baltimore and the District of Columbia and of the 6 counties of Georgia containing cities of 50,000 population or more have been combined to form the urban group. In the rural group are included all the 23 counties of Maryland and the remaining 153 counties of Georgia. In figure 3 the influence of age on the patient load is demonstrated for both groups. One is also able to perceive more clearly the differences between the average patient load of urban and rural physicians. For the ages below 65 years the rural physicians consistently exhibit a greater patient load. This greater patient load may be regarded as a consequence of the smaller number of physicians in the more rural areas.

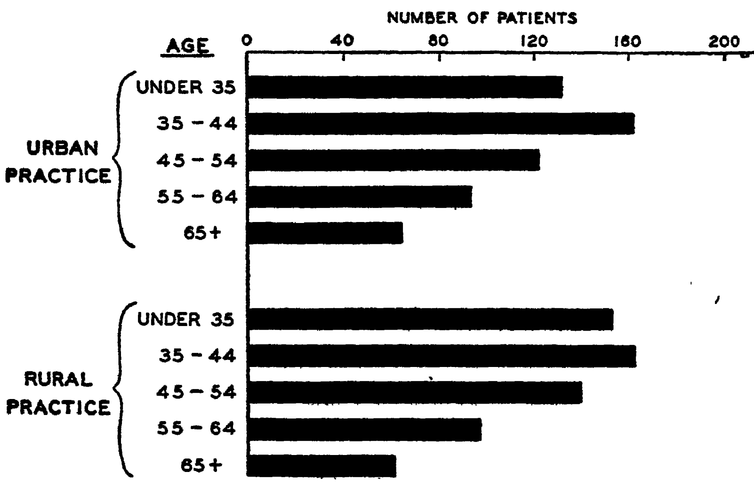

FIGURE 3.—Average number of patients seen in 1 week by white male general practitioners in urban and rural practice.

Age differences are also to be observed with reference to the ratio of home calls to office calls. It is found that the ratio increases with age of physician; that is, the older general practitioners make relatively more home calls than do the younger ones. The following table compares the youngest and oldest age groups in this respect:

Age group	Ratio of home calls to office calls (office calls=100)				
	District of Columbia	Baltimore	Maryland counties	Georgia counties	
				Urban	Rural
Under 35	24	26	27	26	26
65 and over	38	64	33	41	46

Perhaps the above is evidence of differences in manner of practice, or it may represent differences in the kinds of patients seen by the younger and by the older men.

PATIENT LOAD OF FEMALE AND OF NEGRO PHYSICIANS

The small number of Negro male physicians and of female physicians, both Negro and white, does not permit adequate comparison with respect to age and specialty. Indeed, there are so few Negro physicians in the Maryland counties and so few female physicians in private practice in Georgia that the data on them are not presented. The pertinent data for these groups are presented in table 2 and appendix table 2. From the tables it will be seen that Negro physicians in urban areas have about the same average patient load as their white colleagues. On the other hand, the average patient load of the rural Negro practitioner is quite low. With reference to the female physicians, it is found that the younger practitioners have a greater patient load than the older physicians, and that female physicians carry a much lower patient load than the males. But caution is urged in the interpretation of these data because of the small numbers of physicians involved.

TABLE 2.—*Average weekly patient load of Negro male and of female physicians, by place of practice*

Sex and color, and place of practice	Number of physicians giving information	Weekly patient load					
		Averages				Standard deviations	
		Office	Hospital	Home of patient	Total	Office	Total
Negro males:							
District of Columbia	48	78	6	23	107	73	88
Baltimore, Md	29	88	8	30	126	60	74
Georgia:							
Urban	24	67	4	39	110	61	84
Rural	23	50	1	24	75	47	60
Total	47	59	2	31	92	55	76
Females (all):							
District of Columbia	19	62	10	14	86	37	53
Baltimore, Md	16	43	15	6	64	60	68

PATIENT LOAD OF SPECIALISTS

Only those physicians with practice limited to a particular branch of medicine have been classified as specialists. In terms of the number of physicians involved, the major types of specialty are: Internal medicine, surgery (including orthopedics), obstetrics and gynecology, pediatrics, and ophthalmology and otorhinolaryngology.[5] The average

[5] Ophthalmology and otorhinolaryngology have been combined because of the large number of eye, ear, nose, and throat specialists in these samples.

weekly patient load of these specialists is presented in table 3 and appendix table 3. A sufficient number of neurologists and psychiatrists in the District of Columbia and Baltimore responded so that data for this group are also included in the table. No distinction is made between rural and urban specialists in Georgia since practically all specialists are located in cities and large towns.

TABLE 3.—*Average weekly patient load of white male physicians engaged in practice limited to special fields*

Specialty and place of practice	Number of physicians giving information	Weekly patient load: Averages: Office	Hospital	Home of patient	Total	Standard deviations: Office	Total
Internal medicine:							
District of Columbia	50	71	10	14	95	54	61
Baltimore, Md	81	49	10	17	76	40	54
Georgia	42	84	19	17	120	53	77
Surgery:							
District of Columbia	37	66	21	8	95	59	85
Baltimore, Md	55	74	25	11	110	63	78
Georgia	39	87	28	9	124	61	82
Obstetrics and gynecology:							
District of Columbia	31	75	16	8	99	37	44
Baltimore Md	47	56	22	7	85	27	41
Georgia	16	88	21	8	117	40	53
Pediatrics:							
District of Columbia	27	62	10	23	95	32	44
Baltimore, Md	19	51	15	50	116	29	62
Georgia	28	91	12	36	139	39	60
Ophthalmology and otorhinolaryngology:							
District of Columbia	40	89	7	3	99	44	47
Baltimore, Md	51	100	19	3	122	74	80
Georgia	48	111	8	5	124	61	71
Neurology and psychiatry:							
District of Columbia	13	20	10	1	31	7	26
Baltimore, Md	12	20	7	4	31	12	15

The data on the patient load of specialists reveal little regularity of pattern. While the specialists of the District of Columbia and Baltimore, with the exception of the pediatricians and the ophthalmologists and otorhinolaryngologists, carry a somewhat lower patient load on the average than do the general practitioners, specialists in Georgia consistently have a higher patient load. Neither are comparisons of specialists under 45 years of age with those 45 years of age and older very revealing. The only specialties having the same age difference in all areas—a higher patient load among the younger men—are surgery and eye, ear, nose, and throat work.

As is to be expected, the relative number of home visits made by specialists is small. Visits by pediatricians constitute an exception, being even greater in proportion to office visits than is the case for general practitioners. The standard deviation of the patient load of specialists is in general smaller than that of general practitioners. This probably reflects the greater homogeneity of the activities of specialists in comparison with general practitioners.

PATIENT LOAD AND OFFICE WORKING TIME

General practitioners in the larger cities spend an average of 5.2 hours per day in the office seeing patients; in more rural practice, they spend about 6 hours per day in the office. These data are brought out in table 4. On the whole, it would appear that the older physicians hold only slightly shorter office hours than the younger men. Therefore, as table 4 clearly shows, the younger men see more patients per unit of time than do the older physicians. The average number of patients per hour is found to be nearly the same for both Maryland groups and for the practitioners of the Georgia urban counties. Only the practitioners of rural Georgia have an appreciably lower rate.

Judged from the data at hand, the rate of weekly patients per hour for the Maryland practitioners under 45 years of age may be regarded as an optimum rate. It can be calculated, then, that at

TABLE 4.—*Average number of hours spent in office seeing patients. White male general practitioners*

Age group	Average number of hours per day (± standard deviations)				Estimated average number of weekly office patients per hour spent in office per day			
	Baltimore	Maryland counties	Georgia		Baltimore	Maryland counties	Georgia	
			Urban counties	Rural counties			Urban counties	Rural counties
Under 35	5.2±1.8	6.1±1.8	5.1±1.3	7.5±2.1	20	20	16	15
35–44	5.8±2.0	6.5±1.6	5.9±1.6	7.2±1.7	19	20	20	16
45–64	4.9±1.8	5.5±1.8	5.0±1.7	6.4±2.2	14	16	15	12
65 and over	4.7±1.6	5.3±2.0	5.2±2.0	5.8±2.1	9	8	7	7
All ages	5.2±1.8	5.9±1.8	5.2±1.7	6.5±2.3	16	16	15	12

the rate of 20 patients weekly for each hour spent daily in the office and under conditions which would allow a constant flow of patients at the same rate, the average weekly office patient load would increase from 20 patients for the physicians who spend 1 hour in the office to 160 patients for those who spend 8 hours. In figure 4 this estimate is compared with changes in office patient load with every hour spent in the office as observed in the sample studied.

From the data given in the figure, it appears that the Maryland general practitioners under 45 years of age actually do increase the number of their office patients at a constant rate of approximately 20 patients per week for each additional daily hour spent in the office. A linear trend but of lesser slope is also observed for the Georgia practitioners under 45 years of age for office work up to 7 hours' duration. These physicians add only about 15 weekly patients for each extra hour spent in the office.

When all ages are combined, the increment in average patient load for each additional hour spent in office is less than that for the men under 45 years of age. The men of this age group see on the average almost 20 more patients per week for each hour spent in the office than do the physicians of all ages. The pattern of differences

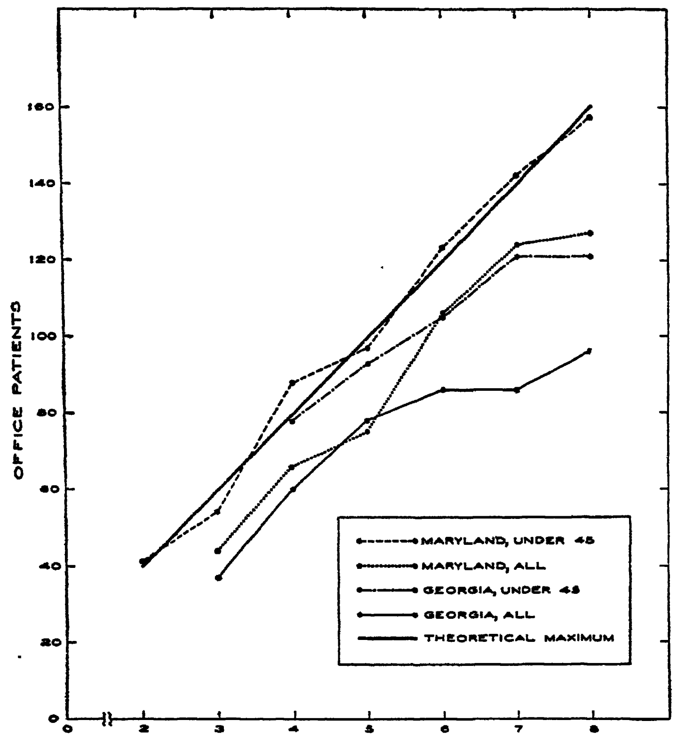

FIGURE 4.—Average number of office patients seen in 1 week by Maryland and Georgia white male general practitioners, according to number of daily office hours.

between the patient loads of the Maryland and of the Georgia practitioners of all ages is the same as that between the practitioners under 45 years of age.

ESTIMATE OF OPTIMUM PATIENT LOAD

In the Georgia survey, the physicians were specifically asked to state the number of patients they could see in 1 week and still furnish satisfactory care. Of the urban general practitioners who replied, 60 percent declared that they could increase their present patient load, while the remainder stated that their present patient load was as high as or higher than they could manage. Among the rural general practitioners only 49 percent declared that they could increase their patient load.

If we add to the actual patient load the number of additional patients that the physicians believe they can serve and assume that the physicians who already carry an excessive patient load will continue to do so, then the maximum patient load of the urban physicians will amount to 135 patients weekly, and of the rural general practitioners to 128 patients. At present the patient load equals 112 and 111 patients for urban and rural general practitioners, respectively.

TABLE 5.—*Comparison of number of patients physicians stated they could see with number of patients seen. Georgia white male general practitioners*

Age group (1)	Number of patients seen in 1 week (2)	Number of patients that could be seen (3)	Percent excess of column 3 over column 2 (4)
Urban counties:			
Under 35	120	116	(−3)
35–44	168	181	8
45–64	108	132	22
65 and over	55	65	18
All ages	112	129	15
Rural counties:			
Under 35	145	153	6
35–44	155	159	3
45–64	113	128	13
65 and over	62	70	13
All ages	111	123	11

On the other hand, if the actual patient loads are adjusted to the stated capacities of the physicians, i. e., patients are added or subtracted according to the physician's own evaluation of his optimum patient load, the results shown in table 5 are obtained. The younger general practitioners have almost reached the optimum patient load and, as a matter of fact, the urban physicians under 35 years of age believe that they have slightly more patients than they can satisfactorily serve. The older men can increase their patient load relatively more than the younger men, but the average patient load that the men above 45 years of age can carry remains lower than that of the men below this age. For example, the general practitioners between 45 and 64 years of age in the urban counties believe that they can increase their present patient load by 22 percent on the average. This would bring their patient load to 132 patients, which is less than the actual patient load of the men between 35 and 44 years. The general practitioners 65 years of age and older in the urban counties can raise their patient load by 18 percent on the average, but it still would leave their patient load at 65 patients weekly.

Taking all ages together the optimum patient load of the urban general practitioners equals 129, and of the rural men, 123. These averages represent the most patients that physicians believe they can treat under existing conditions of practice and still furnish satisfactory care. From the information obtained, then, it may be concluded

that 125 weekly patients constitute the highest average patient load that, under conditions prevailing in Georgia, can be carried by a group of physicians of the observed age distribution. This average of 125 patients weekly does not, however, represent the maximum patient load of physicians. Under other conditions of practice more patients could be seen. For example, if it were possible to limit the practice entirely to the office and to arrange the schedule of visits so that the patients come to the office at a constant rate and without interruptions, then for each 8 hours daily spent in the office, an average of 160 patients weekly could be seen by the general practitioners, as is indicated in figure 4 and discussed above. These considerations lead one to believe that the true maximum patient load, i. e., the maximum working capacity of the average general practitioner following prevailing precepts of practice, lies between 125 and 160 patients weekly.

PHYSICIANS REQUIRED FOR PRESENT VOLUME OF SERVICE

The data on patient load offer the possibility of arriving at a measure of the amount of medical services given by the physicians of a community to private patients. The product of the average weekly patient load by the total number of physicians of the community can be assumed to give the number of persons who visited the physician or were visited by him during the week. Assuming also that the physician's year is composed of 50 weeks, then the number of persons seen in 1 week multiplied by 50 will yield an estimate of the total number of calls or services rendered by private practitioners in a year. The results of these computations, expressed in terms of annual services per person, are shown in table 6. The

TABLE 6.—*Estimated annual services per person obtained from private practitioners*

Type of practice	[illegible]				
	District of Columbia	Baltimore	Maryland (total)	Georgia (urban)	Georgia (total)
Male white:					
General practice	2.13	3.38	3.07	2.55	2.23
Limited:					
Internal medicine	.57	.39	.21	.41	.13
Surgery	.51	.49	.29	.32	.16
Obstetrics and gynecology	.39	.37	.18	.15	.05
Pediatrics	.23	.32	.17	.27	.11
Ophthalmology and otorhinolaryngology	.50	.42	.26	.41	.18
Neurology and psychiatry	.04	.04	.02	.01	(2)
Other [3]	.25	.24	.12	.24	.08
All male white practitioners [3]	4.62	5.65	4.32	4.36	2.94
Negro male	.95	.40	.26	.46	.17
Female	.29	.12	.09	.07	.03
All practitioners	5.86	6.17	4.67	4.89	3.14

[1] The following populations were assumed: District of Columbia, 830,000; Baltimore, 894,100; Maryland, 1,931,200; Georgia (urban) 838,900; Georgia (total), 3,123,700.
[2] Less than 0.005.
[3] Exclusive of radiology, industrial medicine and surgery, clinical pathology, and anesthesiology.

table reveals the influence of urbanism and of economic factors on the volume of medical care received by a population. In Maryland, the average annual number of services per person comes to 4.7 as compared with 3.1 in Georgia. In Baltimore City the annual number of services per person amounts to 6.2, in the District of Columbia to 5.9, and in the urban counties of Georgia to 4.9, while in the counties of Maryland and in the rural counties of Georgia it equals 3.4 and 2.5, respectively.[6] It should be pointed out that the higher rate of services per person calculated in the more urban areas does not simply mean that more care is given to the population of these areas than to the rural population; the higher rate is in part also due to the flow of patients from rural to urban areas, which generally contain medical centers. This is equivalent to increasing the population which is served by physicians in urban areas.

In order to maintain at least the volume of medical care received at present by a population and at the same time to withdraw physicians from that population, it is necessary first to establish what is the smallest number of physicians that can furnish the required services. It is obvious that the number to be determined is a function of the working capacity of the physicians, i. e., of the patient load that they can carry. From the statistics shown in the preceding tables one can estimate what the patient load of the physicians remaining in practice would be in the event that a stated number of physicians were withdrawn from the population. The results of the calculations are shown in table 7 and figure 5, which illustrate for the areas surveyed the relationship of the reduction in the ratio of physicians to population to the patient load of the remaining white male general practitioners. In the last column of table 7 an attempt is made to measure the effects of the age differences in patient load and the age selection of the physicians withdrawn from the population. Assuming that all the physicians withdrawn from civilian practice are below 45 years of age, the percentage increase that would occur in the patient load of the remaining practitioners has been computed on the basis of the age composition of the remaining men and of the average patient load observed for practitioners of the specified age composition. Thus, an increase in the patient load of the general practitioners of Baltimore City to 180 patients per week due to the postulated withdrawal of 173 physicians under 45 years of age means an increment of 51 percent if the increase is calculated from the all age average patient load of 119, but of 75 percent when it is calculated from the patient load of the men having the age composition of those who would remain in practice.

The most striking aspect of the data shown in the table and figure

[6] These are services received from private practitioners only. The *total* amount of medical services obtained per capita would include the services received in public clinics.

is the different ratios of persons per physician that will produce the same patient load in each of the samples studied. Thus, a patient load of 125 patients is obtained in Georgia when there are between 1,900 and 2,000 persons per physician; in Maryland when there are 1,190 persons per physician; in the District of Columbia and Baltimore when the number of persons per physician equals less than 900. If it is accepted that an average patient load of 125 patients represents the optimum, then it would appear that the number of persons per physician should not be increased to more than 900 in Baltimore and the District of Columbia, or to more than 1,200 and 1,950 in Maryland and Georgia, respectively.

On the other hand, it has been discussed above that an average of 160 patients weekly represents the maximum patient load that can be expected when the physician sees all patients in the office at

TABLE 7.—*Estimated average patient loads for specified ratios of physicians to population*

Rates of all active private practitioners to population	Number of white male general practitioners		Average weekly patient load of remaining practitioners	Percentage increase in patient load	
	To be withdrawn [1]	Remaining		Over present average of total [3]	Over present average of remaining practitioners [3]
	District of Columbia				
1:838 [2]	0	308	115	0	0
1:900	28	280	127	10	12
1:1000	67	241	147	28	34
1:1100	98	210	169	47	58
1:1200	124	184	193	68	87
	Baltimore				
1:841 [2]	0	508	119	0	0
1:900	38	470	129	8	11
1:1000	92	416	145	22	29
1:1100	136	372	163	37	51
1:1200	173	335	180	51	75
	Maryland (total)				
1:1190 [2]	0	948	125	0	0
1:1200	9	939	126	1	1
1:1300	90	858	138	10	14
1:1400	160	788	150	20	27
1:1500	220	728	163	30	43
1:1600	273	675	176	41	60
	Georgia (total)				
1:1758 [2]	0	1,260	111	0	0
1:1800	32	1,228	114	3	4
1:1900	103	1,157	121	9	12
1:2000	167	1,093	128	15	22
1:2100	225	1,035	135	22	32
1:2200	278	982	142	28	42

[1] Assuming proportion of general practitioners to all practicing physicians to be the same as of Oct. 1, 1942 (for Georgia, Dec. 15, 1942).
[2] Ratio on Oct. 1, 1942 (for Georgia, Dec. 15, 1942).
[3] Assuming that all withdrawals are below 45 years of age.

the rate shown by the younger Maryland practitioners. To retain the weekly patient load at 160 patients or less will require that the persons per physician will not exceed 1,100 in Baltimore and Washington, or 1,500 in Maryland, or 2,400 in Georgia. Therefore, it can be inferred that to maintain the volume of medical care given at present and under existing conditions of practice by the physicians of the areas studied, the number of persons per physician must be held at 900 to 1,100 in the Baltimore and Washington areas, at 1,200 to 1,500 in Maryland, and at 2,000 to 2,400 in Georgia.

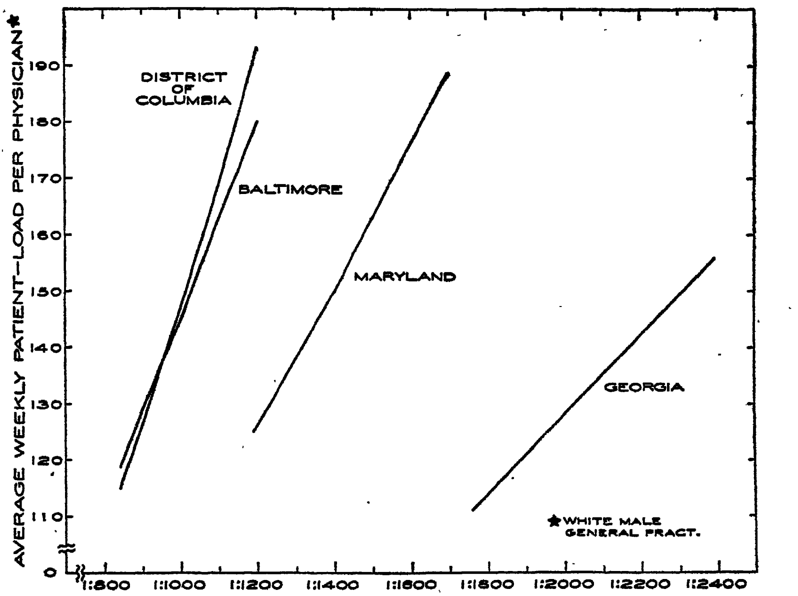

FIGURE 5.—Estimated change in average patient load of remaining general practitioners as population per physician increases.

SUMMARY AND DISCUSSION

The main findings that emerge from the comparison of the patient loads of Maryland, Georgia, and District of Columbia physicians may be summarized as follows:

The average weekly patient load of white male general practitioners is lowest in Georgia, 111 patients, and highest in Maryland, 126 patients. In the urban counties of Georgia it equals 112 patients, a value only slightly lower than that of 115 patients found in the District of Columbia and 119 in Baltimore City.

In Maryland the average weekly patient load of the general practitioners of the part of the State outside of Baltimore City equals 132 and is higher than that of Baltimore. In Georgia, instead, the

patient load of the physicians of the rural counties equals 111, an average almost identical with that of the physicians of the urban counties.

The distribution of physicians according to size of patient load has very similar characteristics in each of the areas surveyed, but less variation is found among specialists than among general practitioners.

In Maryland and the District of Columbia, the weekly average patient load of most types of specialists is lower than that of the general practitioners. The reverse is found to be true in Georgia.

In all the areas, the general practitioners 35 to 44 years old have the highest average weekly patient load and also see more patients per hour spent in the office than do the practitioners of other age groups. The average patient load decreases regularly with advancing age above 45 years.

The general practitioners of Georgia spend on the average slightly more time in the office than do the Maryland men, but with increasing office hours the number of additional patients seen by Georgia practitioners is less than that for the Maryland practitioners.

From the data on the patient load it is estimated that the population of Georgia receives annually from private practitioners 3.1 services per person, while that of Maryland receives 4.7. If the present volumes of services are to be maintained, it is calculated that the number of persons per physician cannot be increased beyond 1,200–1,500 in Maryland and 2,000–2,400 in Georgia.

Before discussing the significance of these findings, it is well to emphasize that the data refer to the activities of physicians as they are manifest at present, that is, after the entrance of some 30 percent of the active practitioners into the armed forces. One effect of this withdrawal, the increase in the patient load of the remaining physicians, is immediately recognized. What other effects it has had cannot be so easily surmised and, therefore, any inferences to be drawn from the above findings should be accepted with due caution.

It is not possible to determine to what extent the recent withdrawal of younger practitioners, through selective redistribution of their patients, may account for the wide variation found in patient load of individual physicians, or in the differences in patient load found in the several age groups. Both phenomena are observed to a very similar degree in all of the areas surveyed. It seems probable that the wide variation in patient load reflects differences in type of practice as well as differences in habits of working among individual physicians. Since the general practitioner group includes those with special interests, there will be some among these whose services usually require a high expenditure, and others whose services commonly require a low expenditure of time per patient. This explanation is consistent with the finding that among the practitioners of each type of

specialty the variation in patient load, measured by the standard deviation, is smaller than among general practitioners.

The differences in the patient load carried by the physicians of the several age groups are of particular significance in considering the problem of satisfying the demands of a population for medical care. The data clearly show that the younger physicians not only see a greater number of patients per week but also see more patients per unit of work time than do the older men. While it is possible that these findings may be explained in part by a greater amount of time lost by the older men between patients' visits, it is evident from the physicians' own estimates of their maximum capacities that the physicians over 45 years of age cannot carry, on the average, as large a patient load as can the younger men.

The resemblances and differences in patient load of physicians among the areas surveyed also furnish a clearer perspective of other aspects of the problem of satisfying the medical demands of populations. The patient load is a measure of the work accomplished; it is a function of both the supply of physicians and the demand made upon them. Thus, one finds that the patient load of the physicians practicing in the counties of Maryland is high and in fact falls within the limits of estimated maximum patient load—between 125 and 160 patients weekly. It seems safe to conclude that in the counties of Maryland the demand for medical care is such as to require the maximum amount of work which, on the average, can be given by the existing number of physicians. Similarly, when it is found that the specialists of Georgia, in contrast to the specialists of other areas, have a higher patient load than the general practitioners of the same State, it can be taken to mean that in relation to demand there are fewer specialists in Georgia than in other areas.

It is particularly to be noted that although Georgia possesses, relative to population, only about two-thirds of the number of physicians practicing in Maryland, the average patient load per practitioner in Georgia is not higher but instead is lower than that in Maryland. The rate of provision of medical services is therefore much lower in Georgia than in Maryland. Most of the Georgia physicians stated, moreover, that they could carry heavier patient loads, so that it is quite evident that the demand for services is lower in Georgia than in Maryland. Since the demand for medical services,[7] like the demand for any other economic commodity, is closely related to the economic status of the purchasers, this finding is not surprising in view of the socio-economic differences between Georgia and Maryland. Long ago it was shown that there is positive correlation between the

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[7] "Demand," used here in the economic sense, is not to be confused with "need" for medical services. The number of persons actually seen by physicians will not, except under ideal conditions, equal the number of persons needing medical care.

economic situation of a State and the number of physicians therein.[8] As Pearl so aptly stated it, "The physicians behave, in the conduct of life, about as any group of sensible people would be expected to. They do business where business is good, and avoid places where it is bad."

The findings in Georgia and Maryland emphasize that it is a fallacy to assume that a large number of physicians per unit of population indicates an oversupply (in the strict economic sense of the term) of physicians, or a small number an undersupply. The ratio of physicians to population constitutes nothing more than an index of the maximum amount of services that can be provided, but whether or not the physicians' potential services are fully utilized will depend not on their number but on the effective demand for services. The ratio is, moreover, only a crude index and does not furnish pertinent information regarding the main problem of determining the smallest number of physicians sufficient to satisfy present civilian demand. As stated above, assuming the same maximum patient load for the physicians of both Maryland and Georgia, it is estimated that in Maryland the number of persons per physician could be increased to 1,200 to 1,500, but in Georgia, because the demand for services is much lower, it could reach 2,000 to 2,400. Although these numerical results are to be accepted with caution, it seems safe to generalize that in different populations utilization of the full working capacities of physicians may be achieved at different levels of ratio of physicians to population. If this is true, a significant corollary is that any plan aimed at utilizing fully the medical resources of a population must be founded on accurate knowledge of the demand for physicians' services and of the amount of work physicians are able to do. Such knowledge can only be gained from data on the patient load or its equivalent.

Appendix

1.—District of Columbia questionnaire

(The physicians were asked to state:)

1. Number of patients (different individuals) seen, and visits made to or by residents of the District of Columbia last week (Aug. 30–Sept. 5):

	Patients	*Visits*
In office	--------	--------
In hospital	--------	--------
At patient's home	--------	--------

2. Number of patients (different individuals) seen, and visits made to or by persons living outside the District of Columbia (Aug. 30–Sept. 5):

	Patients	*Visits*
In office	--------	--------
In hospital	--------	--------
At patient's home	--------	--------

[8] Pearl, R.: Distribution of physicians in the United States. J. Am. Med. Assoc., 84:1024–1028 (April 4, 1925).

Appendix—Continued

1.—District of Columbia questionnaire—Continued

3. What is your daily routine by the clock in seeing patients in:

	Week days	*Sundays*
Office________________		
Hospitals_____________		
Home visits___________		
Hospital or public clinics_		

2.—Maryland questionnaire

(The physicians were asked to state:)

1. Number of patients (different individuals) seen last week (Oct. 5–Oct. 10):
   A. Patients living in the county (or Baltimore City) where you practice:
      In office____________________________________ ________
      In hospital__________________________________ ________
      At patient's home____________________________ ________
   B. Patients living in Maryland outside the county (or Baltimore City) where you practice:
      In office____________________________________ ________
      In hospital__________________________________ ________
      At patient's home____________________________ ________
   C. Patients living outside Maryland:
      In office____________________________________ ________
      In hospital__________________________________ ________
      At patient's home____________________________ ________
2. How many hours a day do you routinely spend in your office seeing patients? ________

3.—Georgia questionnaire

(The physicians were asked to state:)

1. Number of patients (different individuals) seen last week (Dec. 13–Dec. 19):
   In office____ ________
   In hospital______________________________________ ________
   At patient's home________________________________ ________
2. What is the maximum number of patients that you think you can see in 1 week and still furnish satisfactory care? ________
3. How many hours a day do you routinely spend in your office seeing patients? ________

TABLE 1.—*Average weekly patient load of white male general practitioners, by place of practice and age of physicians*

Age group	Number of physicians giving information	Weekly patient load: Averages: Office	Averages: Hospital	Averages: Home of patients	Averages: Total	Standard deviations: Office	Standard deviations: Total
District of Columbia:							
Under 35	26	96	8	23	127	49	66
35–44	58	102	10	23	135	76	87
45–64	43	89	7	22	118	68	90
65 and over	29	40	3	15	58	40	52
All ages	156	86	8	21	115	68	84
Baltimore:							
Under 35	51	102	7	27	136	62	77
35–44	77	113	9	38	160	67	92
45–64	123	67	6	30	103	58	82
65 and over	37	42	2	27	71	38	70
All ages	288	82	6	31	119	64	88
Maryland, exclusive of Baltimore City:							
Under 35	35	122	8	33	163	78	90
35–44	79	132	10	38	180	73	89
45–64	97	86	6	27	119	60	72
65 and over	51	43	3	14	60	37	46
All ages	262	96	7	29	132	71	88
Maryland, total:							
Under 35	86	110	7	30	147	70	84
35–44	156	123	9	38	170	71	91
45–64	220	75	6	29	110	59	78
65 and over	88	43	2	19	64	37	57
All ages	550	89	7	30	126	68	88
Georgia, urban:							
Under 35	19	82	17	21	120	48	79
35–44	27	118	23	27	168	53	71
45–64	100	76	8	24	108	51	68
65 and over	24	37	3	15	55	29	44
All ages	170	78	11	23	112	53	73
Georgia, rural:							
Under 35	40	109	8	28	145	52	62
35–44	76	113	13	29	155	62	75
45–64	219	79	6	28	113	55	70
65 and over	101	41	2	19	62	42	67
All ages	436	79	6	26	111	59	77
Georgia, total:							
Under 35	59	100	11	26	137	53	69
35–44	103	114	16	28	158	60	74
45–64	319	78	6	27	111	53	70
65 and over	125	40	2	18	60	40	64
All ages	606	79	7	25	111	57	76

TABLE 2.—*Average weekly patient load of Negro male and of female physicians, by place of practice and age of physicians*

Place of practice and age	Number of physicians giving information	Weekly patient load: Averages: Office	Hospital	Home of patients	Total	Standard deviations: Office	Total
NEGRO MALES							
District of Columbia:							
Under 45	24	110	9	32	151	84	96
45 and over	24	46	3	14	63	40	50
All ages	48	78	6	23	107	73	88
Baltimore:							
Under 45	13	106	10	26	142	60	68
45 and over	16	75	6	32	113	56	76
All ages	29	88	8	30	126	60	74
Georgia, urban:							
Under 45	7	110	8	60	178	71	96
45 and over	17	49	2	30	81	46	61
All ages	24	67	4	39	110	61	84
Georgia, rural:							
Under 45	7	60	(1)	24	84	28	36
45 and over	16	45	1	23	69	53	69
All ages	23	50	1	24	75	47	60
Georgia, total:							
Under 45	14	85	4	42	131	60	86
45 and over	33	47	2	27	76	50	64
All ages	47	59	2	31	92	55	76
FEMALES							
District of Columbia:							
Under 45	13	65	13	13	91	41	60
45 and over	6	54	3	16	73	26	29
All ages	19	62	10	14	86	37	53
Baltimore:							
Under 45	6	62	16	9	87	86	91
45 and over	10	31	14	5	50	32	44
All ages	16	43	15	6	64	60	68

[1] Less than 0.5.

TABLE 3.—*Average weekly patient load of white male physicians engaged in practice limited to special fields, by place of practice and age group of physicians*

Specialty, place of practice, and age group	Number of physicians giving information	Weekly patient load: Averages: Office	Averages: Hospital	Averages: Home of patients	Averages: Total	Standard deviations: Office	Standard deviations: Total
INTERNAL MEDICINE							
District of Columbia:							
Under 45	32	72	9	15	96	48	46
45 and over	18	69	11	12	92	63	81
All ages	50	71	10	14	95	54	61
Baltimore:							
Under 45	33	51	8	12	71	39	40
45 and over	48	48	11	20	79	41	62
All ages	81	49	10	17	76	40	54
Georgia:							
Under 45	20	98	23	18	139	62	87
45 and over	22	72	16	16	104	37	61
All ages	42	84	19	17	120	53	77
SURGERY							
District of Columbia:							
Under 45	23	72	24	9	105	70	101
45 and over	14	56	15	5	76	33	42
All ages	37	66	21	8	95	59	85
Baltimore:							
Under 45	16	80	20	14	114	68	86
45 and over	39	71	26	9	106	61	75
All ages	55	74	25	11	110	63	78
Georgia:							
Under 45	6	118	18	16	152	64	61
45 and over	33	81	29	8	118	60	85
All ages	39	87	28	9	124	61	82
OBSTETRICS AND GYNECOLOGY							
District of Columbia:							
Under 45	22	86	19	7	112	36	44
45 and over	9	50	8	12	70	24	27
All ages	31	75	16	8	99	37	44
Baltimore:							
Under 45	17	63	14	5	82	25	28
45 and over	30	52	27	9	88	28	47
All ages	47	56	22	7	85	27	41
Georgia:							
Under 45	5	77	8	8	93	21	28
45 and over	11	93	27	8	128	45	57
All ages	16	88	21	8	117	40	53
PEDIATRICS							
District of Columbia:							
Under 45	18	62	10	25	97	31	45
45 and over	9	63	10	19	92	34	40
All ages	27	62	10	23	95	32	44
Baltimore:							
Under 45	7	67	15	47	129	23	37
45 and over	12	42	14	52	108	28	72
All ages	19	51	15	50	116	23	62

TABLE 3.—*Average weekly patient load of white male physicians engaged in practice limited to special fields, by place of practice and age group of physicians*—Con.

Specialty, place of practice, and age group	Number of physicians giving information	Weekly patient load					
		Averages				Standard deviations	
		Office	Hospital	Home of patients	Total	Office	Total
PEDIATRICS—continued							
Georgia:							
Under 45	11	94	10	32	136	49	72
45 and over	17	90	13	38	141	28	51
All ages	28	91	12	36	139	39	60
OPHTHALMOLOGY AND OTORHINOLARYNGOLOGY							
District of Columbia:							
Under 45	23	102	8	4	114	45	46
45 and over	17	71	4	3	78	37	41
All ages	40	89	7	3	99	44	47
Baltimore:							
Under 45	17	103	21	2	126	69	71
45 and over	34	99	18	3	120	77	84
All ages	51	100	19	3	122	74	80
Georgia:							
Under 45	11	124	14	9	147	26	39
45 and over	37	107	6	4	117	68	74
All ages	48	111	8	5	124	61	71
NEUROLOGY AND PSYCHIATRY							
District of Columbia:							
Under 45	5	18	1	(1)	19	7	6
45 and over	8	21	15	2	38	6	31
All ages	13	20	10	1	31	7	26
Baltimore:							
Under 45	6	20	4	5	29	14	12
45 and over	6	19	11	4	34	9	18
All ages	12	20	7	4	31	12	15

1 Less than 0.5.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

July 18–August 14, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended August 14, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

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DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The number of cases of poliomyelitis rose from 867 during the preceding 4-week period to 1,686 for the 4 weeks ended August 14. For the country as a whole the incidence was almost 3 times that reported for the corresponding period in 1942 and about 2.3 times the 1938–42 median for this period. While the normal seasonal increase of this disease was apparent in many States, more than 75 percent of the total cases were reported from 7 States, viz., California 420 cases, Texas 330, Oklahoma 164, Kansas 169, Illinois 117, New York 68, and Connecticut 60 cases. The excesses in these States affected each geographic region except the South Atlantic and East South Central; in those regions the incidence was below normal.

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 1,111 during the preceding 4 weeks to 826 during the current 4-week period. The number of cases was almost 4 times that for the corresponding period in 1942 and almost 8 times the 1938–42 median and was the highest incidence recorded for this period in the 15 years for which these data are available. Each region of the country reported a relatively high incidence, the excesses ranging from 2 times the median in the East South Central region to almost 15 times the median in the Pacific region.

Measles.—The incidence of measles during the current period was the highest reported for the corresponding 4-week period in any year on record. The number of cases (11,896) was more than 1.7 times that reported for the corresponding period in 1942 and about 1.4 times the 1938–42 median. Each region except the East South Central reported an excess over the median. The greatest excesses occurred in the North Central and South Atlantic regions, with minor excesses in the other regions; in the Pacific region the incidence was about normal.

Influenza.—For the 4 weeks ended August 14 there were 2,268 cases of influenza reported, as compared with 1,396 during the corresponding period in 1942, which figure also represents the 1938–42 median for this period. In the New England and North Central regions the incidence was below the seasonal expectancy, but in all other regions the numbers of cases were above the median, the greatest excesses being reported from the South Atlantic and West South Central regions.

Whooping cough.—The number of cases (14,975) of this disease was about 10 percent above the number reported in 1942, but it was only slightly above the normal seasonal expectancy. In five of the nine geographic regions the incidence was relatively high, but in the other four regions the numbers of cases either closely approximated the median or fell considerably below it.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases (606) of diphtheria reported for the 4 weeks ended August 14 closely approximated the number reported for this period in 1942 and was about 95 percent of the 1938–42 median incidence. In the West South Central and Pacific regions the incidence was somewhat above the seasonal expectancy, while in the West North Central region the number of cases was about normal; all other regions reported a relatively low incidence.

Scarlet fever.—The incidence of scarlet fever was also relatively low, 2,888 cases being reported for the current period, as compared with 2,582 in 1942 and a 1938–42 median of 2,985 cases. Five of the geographic regions reported excesses over the median and in four regions the incidence was below normal. In New England the number of cases (382) represented an increase of more than 50 percent

Number of reported cases of 9 communicable diseases in the United States during the 4-week period July 18–August 14, 1943, the number for the corresponding period in 1942, and the median number of cases reported for the corresponding period, 1938–42

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Dipththeria			Influenza [1]			Measles [2]		
United States	606	600	640	2,268	1,396	1,396	11,916	6,928	8,591
New England	13	21	17	1	5	3	1,305	877	899
Middle Atlantic	47	52	74	22	18	13	3,245	1,181	2,480
East North Central	83	90	110	81	106	91	3,972	1,246	2,328
West North Central	50	30	51	13	31	26	666	387	387
South Atlantic	132	145	145	887	517	526	741	374	409
East South Central	50	85	85	108	85	85	153	89	210
West South Central	126	119	107	842	392	492	341	297	297
Mountain	28	14	56	192	159	86	492	693	407
Pacific	77	44	61	122	83	82	1,001	1,784	977
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	826	210	122	1,686	570	716	2,888	2,582	2,985
New England	82	28	6	82	28	16	382	300	252
Middle Atlantic	214	67	31	83	81	71	485	493	613
East North Central	148	15	13	158	135	146	586	656	921
West North Central	52	8	8	230	40	40	234	307	307
South Atlantic	129	35	22	30	63	65	313	268	249
East South Central	41	13	20	30	131	42	139	172	169
West South Central	38	14	14	536	63	42	120	135	112
Mountain	19	3	4	67	14	14	207	78	100
Pacific	103	27	7	470	15	30	422	173	243
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	23	16	108	929	995	1,481	14,975	13,584	14,614
New England	0	0	0	26	24	32	735	1,414	945
Middle Atlantic	0	0	0	82	87	140	2,614	3,505	3,505
East North Central	9	5	20	197	95	136	4,167	4,311	4,311
West North Central	3	6	45	47	52	113	1,195	682	760
South Atlantic	0	0	1	185	222	284	2,583	1,233	1,891
East South Central	1	2	2	154	185	187	547	539	562
West South Central	3	0	6	171	241	513	1,214	625	1,016
Mountain	7	3	12	44	64	53	693	431	582
Pacific	0	0	8	23	25	51	1,227	839	1,168

[1] Mississippi, New York, and Pennsylvania excluded; New York City included
[2] Mississippi excluded.

over the median, while in the Pacific region the number of cases (422) was almost 75 percent above the seasonal expectancy.

Smallpox.—Smallpox remained at a comparatively low level. While the number of cases (23) was slightly higher than that reported during the same weeks in 1942, it was only about 20 percent of the 1938–42 median. No cases of smallpox were reported from States along the Atlantic Coast, 6 of the total cases were reported from Illinois, and the remaining cases were widely distributed over the country.

Typhoid and paratyphoid fever.—For the current period there were 929 cases of typhoid fever reported, as compared with 995, 1,199, and 1,481 for the corresponding period in 1942, 1941, and 1940, respectively. The East North Central region alone reported an excess of cases over the 1938–42 median. For the country as a whole the current incidence is the lowest on record for this period.

MORTALITY, ALL CAUSES

A total of approximately 32,000 deaths from all causes was reported by the group of large cities in the United States to the Bureau of the Census for the 4 weeks ended August 14. The number reported for the corresponding period in the 3 preceding years was approximately 30,000 deaths—about 95 percent of the current figure. Due to the internal migration that has taken place since 1940 no accurate population estimates have been made by the Bureau of the Census, so it is uncertain as to how much of the current increase is due to increased population and how much represents an increased death rate.

The monthly death rate from all causes among persons insured in the industrial department of the Metropolitan Life Insurance Co. has been above the corresponding month of the preceding year for every month from October 1942 to June 1943, the latest available date. The average of the excesses in the rates for these 9 months over the corresponding month of the preceding year was about 9 percent.

DEATHS DURING WEEK ENDED AUGUST 21, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 21, 1943	Corresponding week, 1942
Data from 88 large cities of the United States:		
Total deaths	7,543	7,424
Average for 3 prior years	7,141	
Total deaths, first 33 weeks of year	302,827	276,643
Deaths under 1 year of age	642	580
Average for 3 prior years	507	
Deaths under 1 year of age, first 33 weeks of year	21,517	18,421
Data from industrial insurance companies:		
Policies in force	65,741,955	64,962,563
Number of death claims	10,573	9,750
Death claims per 1,000 policies in force, annual rate	8.4	7.8
Death claims per 1,000 policies, first 33 weeks of year, annual rate	10.0	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 28, 1943

Summary

A further increase occurred in the incidence of poliomyelitis during the week. A total of 872 cases was reported for the week, as compared with 747 for the preceding week and a 5-year (1938–42) median of 391. The largest comparable weekly total of the past 5 years was 623 cases, reported for the corresponding week of 1940. Considerable increases occurred in Illinois (117 to 194 cases), Texas (52 to 75), Indiana (1 to 19), Oregon (11 to 24), Nebraska (5 to 17), Missouri (14 to 24), and Rhode Island (8 to 12). A decrease was shown in California, from 163 to 138 cases. The cumulative total for the first 34 weeks of the year is 4,931 cases, as compared with 1,707 for the same period last year and a 5-year median of 2,530.

A total of 166 cases of meningococcus meningitis was reported, as compared with 160 last week and a 5-year median of 25. The largest numbers reported (figures for last week in parentheses) were as follows: New York, 25 (32); Pennsylvania, 18 (6); California, 15 (10); Massachusetts, 13 (6). The cumulative total for the first 34 weeks of the year is 13,694, as compared with a 5-year median of 1,441 and 2,454 last year, the largest number reported for the corresponding period in the past 5 years.

Totals slightly in excess of those for the preceding week were reported for diphtheria, influenza, and typhoid fever, while those of measles, scarlet fever, and whooping cough were slightly lower. No case of smallpox was reported. The current reports of all of these diseases except smallpox and typhoid fever are slightly above the respective 5-year medians, but cumulative figures for the first 34 weeks of the year for all except measles and whooping cough are below the comparable medians.

One case of human plague was reported in Siskiyou County, California.

Deaths recorded in 90 large cities of the United States for the current week totaled 7,784, as compared with 7,676 for the preceding week, and a 3-year (1940–42) average of 7,287. The cumulative total for the first 34 weeks of the year is 315,665, as compared with 288,331 for the same period in 1942.

Telegraphic morbidity reports from State health officers for the week ended August 28, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Aug. 28, 1943	Aug. 29, 1942		Aug. 28, 1943	Aug. 29, 1942		Aug. 28, 1943	Aug. 29, 1942		Aug. 28, 1943	Aug. 29, 1942	
NEW ENGLAND												
Maine	0	0	1	------	------	------	2	6	6	2	0	0
New Hampshire	0	0	0	------	------	------	4	3	0	0	0	0
Vermont	0	1	0	------	------	------	3	24	12	0	0	0
Massachusetts	2	2	2	------	------	------	55	44	44	13	6	0
Rhode Island	0	0	0	1	------	------	10	4	4	2	0	0
Connecticut	2	0	0	------	6	------	11	8	8	8	0	0
MIDDLE ATLANTIC												
New York	8	9	8	------	[1] 1	[1] 2	137	52	90	25	6	2
New Jersey	0	1	1	1	5	2	76	36	31	6	5	0
Pennsylvania	6	2	8	2	------	------	24	20	35	18	6	2
EAST NORTH CENTRAL												
Ohio	6	6	8	3	3	2	50	18	18	8	1	1
Indiana	8	4	4	5	4	4	7	4	3	5	1	0
Illinois	5	9	9	------	8	3	28	13	24	8	1	2
Michigan [2]	5	3	5	------	3	1	232	35	35	7	2	1
Wisconsin	2	6	1	13	------	11	114	44	44	5	1	1
WEST NORTH CENTRAL												
Minnesota	9	1	3	1	------	2	26	6	6	0	0	0
Iowa	4	5	2	------	------	------	5	4	7	3	0	0
Missouri	1	0	5	1	------	1	9	8	3	5	2	1
North Dakota	1	0	2	------	5	1	6	1	1	0	0	0
South Dakota	2	4	4	------	------	------	11	2	1	0	0	0
Nebraska	4	0	1	2	7	------	7	10	1	0	0	0
Kansas	9	1	2	3	2	1	19	9	9	1	0	1
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	0	0	0	1	1	0
Maryland [2]	3	1	1	1	3	3	6	11	4	2	7	1
District of Columbia	0	2	1	------	------	------	6	1	2	0	1	0
Virginia	10	9	16	59	58	40	23	3	15	6	1	0
West Virginia	2	5	3	------	1	8	8	0	1	2	1	1
North Carolina	18	26	26	2	------	------	17	6	6	7	0	0
South Carolina	11	16	16	129	117	117	14	2	16	1	0	0
Georgia	16	8	11	9	1	1	7	0	0	1	0	0
Florida	1	0	3	11	10	2	2	2	2	1	0	0
EAST SOUTH CENTRAL												
Kentucky	4	6	7	------	1	1	14	0	3	0	1	0
Tennessee	3	8	8	8	8	9	5	3	15	1	1	1
Alabama	16	14	14	4	12	7	16	6	17	1	3	1
Mississippi [2]	2	5	14	------	------	------	------	------	------	0	3	0
WEST SOUTH CENTRAL												
Arkansas	7	10	10	2	12	12	8	0	6	0	0	0
Louisiana	1	2	5	1	8	7	3	1	1	0	0	0
Oklahoma	6	1	3	5	6	10	5	4	4	1	0	0
Texas	21	11	18	250	128	98	41	33	24	2	3	1
MOUNTAIN												
Montana	1	3	1	------	------	------	22	9	6	0	0	0
Idaho	1	0	0	------	------	------	0	17	1	1	0	0
Wyoming	0	5	0	------	8	------	2	6	3	0	0	0
Colorado	2	2	7	5	13	2	9	8	5	1	0	0
New Mexico	0	1	1	------	------	------	2	3	3	0	0	0
Arizona	0	0	1	39	26	15	11	6	6	1	0	0
Utah [2]	0	0	0	------	------	------	5	21	6	1	1	0
Nevada	0	0	------	------	------	------	3	0	------	1	0	------
PACIFIC												
Washington	9	1	1	------	------	------	32	42	9	4	0	0
Oregon	3	0	1	1	3	4	7	53	9	0	1	0
California	22	7	8	23	13	12	103	101	74	15	3	0
Total	233	197	218	581	472	415	1,207	689	745	166	58	25
34 weeks	7,498	7,623	9,046	82,248	81,270	152,006	538,338	467,273	467,273	13,694	2,454	1,441

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 28, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Aug. 28, 1943	Aug. 29, 1942		Aug. 28, 1943	Aug. 29, 1942		Aug. 28, 1943	Aug. 29, 1942		Aug. 28, 1943	Aug. 29, 1942	
NEW ENGLAND												
Maine	2	1	0	6	6	2	0	0	0	0	2	1
New Hampshire	0	0	0	8	0	0	0	0	0	0	0	0
Vermont	1	1	0	1	1	2	0	0	0	2	0	0
Massachusetts	8	2	4	66	35	25	0	0	0	6	5	4
Rhode Island	12	0	1	2	3	0	0	0	0	0	0	1
Connecticut	39	3	0	5	4	5	0	0	0	3	0	3
MIDDLE ATLANTIC												
New York	42	19	19	54	46	46	0	0	0	9	7	18
New Jersey	6	26	20	14	15	15	0	0	0	2	4	7
Pennsylvania	9	3	7	32	23	30	0	0	0	11	18	18
EAST NORTH CENTRAL												
Ohio	11	9	9	66	67	43	0	0	0	10	5	15
Indiana	19	5	5	9	11	17	0	0	0	2	2	2
Illinois	194	23	21	25	37	43	0	0	0	4	9	23
Michigan [2]	9	11	11	24	23	36	0	0	1	4	3	7
Wisconsin	8	4	6	20	32	32	0	0	0	1	0	0
WEST NORTH CENTRAL												
Minnesota	10	3	8	14	9	14	0	0	0	0	1	1
Iowa	13	7	4	4	9	10	0	0	0	0	2	3
Missouri	24	5	2	17	8	14	0	0	0	13	10	20
North Dakota	1	2	2	2	1	1	0	0	1	6	1	0
South Dakota	0	0	2	3	2	2	0	0	0	0	0	0
Nebraska	17	7	2	6	5	3	0	0	0	0	2	1
Kansas	66	2	1	21	13	18	0	0	0	5	3	5
SOUTH ATLANTIC												
Delaware	0	1	0	2	3	1	0	0	0	0	0	0
Maryland [2]	1	3	1	12	6	6	0	0	0	2	6	7
District of Columbia	0	1	1	3	5	5	0	0	0	0	1	2
Virginia	1	1	4	19	9	11	0	0	0	8	12	12
West Virginia	4	2	2	19	15	20	0	0	0	12	6	6
North Carolina	1	4	4	30	22	21	0	0	0	10	15	14
South Carolina	2	4	4	10	2	5	0	0	0	4	5	7
Georgia	1	1	2	15	7	8	0	0	0	15	15	28
Florida	0	0	2	5	5	3	0	0	0	3	6	6
EAST SOUTH CENTRAL												
Kentucky	16	9	9	21	17	17	0	0	0	8	11	16
Tennessee	0	10	2	17	14	13	0	0	0	6	5	15
Alabama	3	5	1	18	26	14	0	0	0	4	13	13
Mississippi [2]	1	2	2	8	9	5	0	0	0	6	5	11
WEST SOUTH CENTRAL												
Arkansas	4	5	1	3	1	4	0	1	0	5	12	22
Louisiana	2	2	2	3	2	3	0	0	0	5	6	14
Oklahoma	36	0	1	3	4	5	0	0	0	12	10	24
Texas	75	2	5	19	18	18	0	0	0	14	19	31
MOUNTAIN												
Montana	0	0	0	8	9	7	0	0	0	0	1	1
Idaho	0	1	0	53	0	1	0	1	1	0	1	1
Wyoming	1	1	0	2	2	2	0	0	0	0	0	0
Colorado	21	0	1	18	6	7	0	0	1	0	4	3
New Mexico	4	1	1	0	2	2	0	0	0	0	8	4
Arizona	8	1	1	4	0	1	0	0	0	2	1	1
Utah [2]	13	3	2	2	2	4	0	0	0	0	2	2
Nevada	0	0	------	1	0	------	0	0	------	0	0	------
PACIFIC												
Washington	25	1	1	10	4	7	0	0	0	0	0	4
Oregon	24	0	1	11	5	5	0	0	0	0	1	4
California	138	9	13	52	41	44	0	0	0	6	3	6
Total	872	202	391	767	586	588	0	2	13	200	242	412
34 weeks	4,931	1,707	2,530	98,496	89,759	117,179	609	614	1,971	3,486	4,267	5,405

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 28, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough, Week ended Aug. 28, 1943	Whooping cough, Week ended Aug. 29, 1942	Whooping cough, Median 1938–42	Week ended August 28, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	3	23	23	0	0	0	0	1	0	0	0	0
New Hampshire	3	0	0	0	0	0	0	0	0	1	0	0
Vermont	13	57	29	0	0	0	0	0	0	0	0	0
Massachusetts	94	133	116	1	0	9	0	0	0	0	0	0
Rhode Island	11	23	15	0	0	0	0	0	0	0	0	0
Connecticut	17	52	52	0	1	3	0	1	0	0	0	0
MIDDLE ATLANTIC												
New York	247	305	305	0	2	31	0	0	0	0	0	0
New Jersey	129	240	116	0	0	3	0	0	0	1	0	0
Pennsylvania	200	199	212	0	0	1	0	0	0	0	1	0
EAST NORTH CENTRAL												
Ohio	192	179	214	0	0	6	0	0	0	0	1	0
Indiana	36	30	18	0	0	0	0	0	0	0	0	0
Illinois	123	261	213	0	0	3	0	3	0	0	0	0
Michigan [2]	245	231	215	0	1	5	0	0	0	0	0	0
Wisconsin	232	228	208	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	44	61	47	0	2	0	0	0	0	0	1	0
Iowa	47	13	22	0	0	0	0	0	0	1	0	0
Missouri	20	7	20	0	0	0	1	0	0	0	0	0
North Dakota	27	6	21	0	0	0	0	0	0	0	0	0
South Dakota	6	0	3	0	0	0	0	0	0	0	0	0
Nebraska	24	7	4	0	0	0	0	2	0	0	0	0
Kansas	47	45	45	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	5	0	1	0	0	0	0	1	0	0	0	0
Maryland [2]	82	48	48	0	0	0	24	0	0	4	0	0
District of Columbia	26	11	11	0	0	0	0	0	0	0	0	0
Virginia	82	17	57	0	2	0	299	0	0	3	1	2
West Virginia	37	13	13	0	0	0	0	0	0	1	0	0
North Carolina	111	41	107	0	0	6	0	0	0	2	0	4
South Carolina	101	25	25	0	0	6	0	0	0	0	0	7
Georgia	27	19	19	0	0	7	2	0	0	0	2	42
Florida	21	4	6	0	3	0	1	0	0	0	0	3
EAST SOUTH CENTRAL												
Kentucky	82	35	51	0	0	0	0	0	0	0	0	0
Tennessee	35	37	37	0	0	0	7	0	0	1	2	1
Alabama	14	21	45	0	0	0	0	1	0	0	0	10
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas	35	4	7	0	2	16	0	0	0	0	2	0
Louisiana	8	5	12	0	0	13	0	0	0	0	0	4
Oklahoma	2	4	6	0	0	0	0	0	0	1	0	0
Texas	133	11	111	0	39	261	0	1	0	0	2	64
MOUNTAIN												
Montana	13	30	21	0	0	0	0	0	0	1	1	0
Idaho	5	0	7	0	0	0	0	0	0	0	0	0
Wyoming	4	1	1	0	0	0	0	0	0	0	3	0
Colorado	34	29	29	0	0	15	0	0	0	0	0	0
New Mexico	14	17	12	0	0	2	2	0	0	0	0	0
Arizona	13	12	17	0	1	0	16	0	0	0	0	0
Utah [2]	61	26	26	0	0	0	0	0	0	0	2	0
Nevada	2	0	------	0	0	0	0	0	0	0	1	0
PACIFIC												
Washington	64	12	23	0	0	0	0	0	0	0	0	0
Oregon	41	16	16	0	0	0	0	0	0	0	0	0
California	165	129	129	0	1	7	0	11	0	0	0	2
Total	2,977	2,767	2,965	1	54	394	352	22	0	16	19	139
34 weeks	134,893	125,149	129,238	42	1,405	10,649	4,968	450	18	366	605	2,341
34 weeks, 1942	------	------	------	58	720	5,839	4,524	340	35	389	668	1,972

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 6; New York, 1; New Jersey, 1; Ohio, 1; Illinois, 1; Michigan, 2; North Dakota, 5; Virginia, 2; South Carolina, 3; Georgia, 3; Tennessee, 1; Texas, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 14, 1943

This table lists the reports from 83 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	2	0	0	0	0	0	0	3
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	1	0	0	0
Massachusetts:												
Boston	0	0	------	0	8	3	3	0	16	0	0	28
Fall River	0	0	------	0	0	0	4	0	1	0	0	6
Springfield	0	0	------	0	2	0	0	0	1	0	0	1
Worcester	0	0	------	0	0	0	6	0	3	0	0	0
Rhode Island:												
Providence	0	0	------	0	11	0	0	6	0	0	0	10
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	0	0	0	0	0
New Haven	0	0	------	0	6	2	0	18	1	0	0	5
MIDDLE ATLANTIC												
New York:												
Buffalo	2	0	------	0	0	2	9	1	1	0	0	6
New York	1	0	------	0	111	11	41	18	18	0	6	77
Syracuse	0	0	------	0	1	0	1	0	1	0	0	10
New Jersey:												
Camden	1	0	------	1	0	0	0	0	0	0	1	2
Trenton	0	0	------	0	0	0	1	0	0	0	0	1
Pennsylvania:												
Philadelphia	0	0	------	0	1	4	17	1	6	0	2	79
Pittsburgh	4	0	------	0	4	3	7	0	0	0	0	15
Reading	0	0	------	0	1	0	1	0	0	0	0	8
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	1	0	2	0	8	0	3	0	0	12
Cleveland	1	0	------	0	3	2	6	1	15	0	0	44
Columbus	0	0	------	0	8	0	1	0	6	0	0	14
Indiana:												
Fort Wayne	2	0	------	0	2	0	2	0	0	0	0	0
Indianapolis	0	0	------	0	7	2	3	1	0	0	1	15
South Bend	0	0	------	0	1	0	0	0	0	0	0	0
Terre Haute	2	0	------	0	0	0	0	0	1	0	0	0
Illinois:												
Chicago	5	0	------	0	22	5	12	51	10	0	0	118
Springfield	0	0	------	0	0	0	2	0	0	0	0	0
Michigan:												
Detroit	1	0	------	0	24	4	10	4	11	0	5	63
Flint	0	0	------	0	0	0	0	0	0	0	0	2
Grand Rapids	0	0	------	0	11	0	0	0	0	0	1	23
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	2	0	0	5
Milwaukee	0	0	------	0	27	1	0	0	11	0	0	79
Racine	0	0	------	0	1	0	0	0	2	0	0	15
Superior	0	0	------	0	20	0	0	0	0	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	11	0	2	0	2	0	0	11
Minneapolis	0	0	------	0	3	1	0	3	6	0	0	5
St. Paul	0	0	------	0	7	1	4	1	2	0	0	28
Missouri:												
Kansas City	0	0	------	0	5	0	5	8	2	0	0	19
St. Joseph	0	0	------	0	0	1	0	0	0	0	0	2
St. Louis	0	0	------	0	10	5	7	0	8	0	6	66
North Dakota:												
Fargo	0	0	------	0	3	0	0	0	0	0	0	6
Nebraska:												
Omaha	1	0	------	0	1	0	1	2	3	0	2	0
Kansas:												
Topeka	0	0	------	0	0	0	2	1	0	0	0	19
Wichita	0	0	------	0	0	0	1	7	0	0	0	4
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	2	0	0	0	0	1
Maryland:												
Baltimore	1	1	1	1	17	2	6	0	3	0	0	103
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0

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City reports for week ended August 14, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
SOUTH ATLANTIC—con.												
District of Columbia:												
Washington	0	0	------	0	7	3	8	1	1	0	1	27
Virginia:												
Lynchburg	0	0	------	0	8	0	1	0	0	0	0	18
Richmond	0	0	------	0	2	0	1	0	0	0	0	4
Roanoke	0	0	------	0	0	0	0	0	0	0	0	16
West Virginia:												
Wheeling	0	0	------	0	0	0	0	0	0	0	0	5
North Carolina:												
Raleigh	0	0	------	0	0	0	0	0	0	0	0	4
Winston-Salem	0	0	------	0	0	0	0	0	0	0	0	13
South Carolina:												
Charleston	0	0	4	1	0	0	0	0	0	0	0	0
Georgia:												
Atlanta	1	0	7	0	0	0	3	0	0	0	0	0
Brunswick	0	0	------	0	0	0	1	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	0	0	1	0
Florida:												
Tampa	0	0	1	1	0	0	4	1	0	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	1	1	1	0	3	0	2	0	0	7
Nashville	0	0	------	0	0	0	4	0	0	0	0	17
Alabama:												
Birmingham	0	0	------	0	0	0	4	1	1	0	1	0
Mobile	0	0	------	0	0	2	2	0	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	3	0	1	0	0	0
Louisiana:												
New Orleans	0	0	1	1	5	0	5	0	2	0	0	7
Shreveport	0	0	------	0	0	0	3	1	0	0	0	0
Texas:												
Dallas	0	0	------	0	1	0	2	10	1	0	1	1
Galveston	1	0	------	0	0	0	2	0	1	0	0	1
Houston	2	1	------	0	0	0	4	9	1	0	0	5
San Antonio	0	0	------	0	0	0	10	0	1	0	1	2
MOUNTAIN												
Montana:												
Billings	1	0	------	0	3	0	1	0	1	0	0	1
Helena	0	0	------	0	0	0	0	0	1	0	0	0
Missoula	0	0	------	0	1	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	------	0	6	0	2	6	3	0	1	25
Pueblo	0	0	------	0	3	0	0	1	2	0	0	4
Utah:												
Salt Lake City	0	0	------	0	1	0	0	0	2	0	0	24
PACIFIC												
Washington:												
Seattle	1	0	------	0	6	2	0	4	1	0	0	12
Spokane	0	0	------	0	3	0	1	0	3	0	0	14
Tacoma	0	0	------	0	0	0	0	0	2	0	0	4
California:												
Los Angeles	5	0	1	0	29	0	3	0	8	0	0	24
Sacramento	0	0	------	0	0	0	1	4	1	0	0	5
San Francisco	1	1	------	0	19	2	5	3	5	0	0	13
Total	34	3	17	6	428	58	237	164	172	0	29	1,160
Corresponding week, 1942	38	6	36	1	192	16	191	46	162	0	34	948
Average, 1938–42	54	------	28	[1] 6	[2] 275	------	[1] 222	------	191	2	50	1,281

Anthrax.—Cases: Camden, 1.

Dysentery, amebic.—Cases: New York, 1; Chicago, 1; San Francisco, 2.

Dysentery, bacillary.—Cases: Worcester, 1; New York, 4; Chicago, 1; Minneapolis, 1; St. Louis, 3; Baltimore, 5; Richmond, 1; Nashville, 2; Los Angeles, 5; Sacramento, 1.

Dysentery, unspecified.—Cases: Baltimore, 3; San Antonio, 5.

Rocky Mountain spotted fever.—Cases: St. Louis, 2; Nashville, 1.

Typhus fever.—Cases: Charleston, S. C. (delayed reports), 6; Atlanta, 2; Brunswick, 1; Savannah, 1; Tampa, 2; Nashville, 1; Mobile, 1; Dallas, 3; Galveston, 2; Houston, 3; San Antonio, 1.

[1] 3-year average, 1940–42. [2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 83 cities in the preceding table (estimated population, 1942, 33,711,500)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	0	0	0	0	79.3	13.7	35.6	65.7	62.9	0	0.0	145
Middle Atlantic	3.8	0	0	0.5	56.1	9.5	36.6	9.5	12.4	0	4.3	94
East North Central	6.4	0	0.6	0	74.7	8.2	25.7	33.3	35.6	0	4.1	229
West North Central	2.0	0	0	0	78.2	15.6	43.0	43.0	35.2	0	11.7	313
South Atlantic	3.5	1.7	22.7	5.2	61.1	8.7	45.4	3.5	7.0	0	5.2	334
East South Central	0	0	5.9	5.9	5.9	11.9	77.2	5.9	23.8	0	5.9	143
West South Central	8.8	2.9	2.9	2.9	17.6	0	85.1	58.7	20.5	0	5.9	47
Mountain	16.8	0	0	0	117.7	0	25.2	58.9	75.7	0	8.4	454
Pacific	12.2	1.7	1.7	0	99.6	7.0	17.5	19.2	35.0	0	0	126
Total	5.3	0.5	2.6	0.9	66.2	9.0	36.7	25.4	26.6	0	4.5	179

HUMAN CASE OF PLAGUE IN SISKIYOU COUNTY, CALIF.

A human case of plague was reported in Siskiyou County, California, during the week ended August 28. The case occurred in a boy 11 years of age residing on an Indian reservation in Quartz Valley. The infection was believed to have been contracted on a hunting trip in the mountains near Fort Jones.

One human case of plague was reported in Siskiyou County in November 1942 (terminating fatally on January 10, 1943),[1] and two fatal cases were reported in the county in 1941.

PLAGUE INFECTION IN CALIFORNIA AND MONTANA

Plague infection has been reported proved in pools of fleas and tissue from rodents collected in California and Montana as follows:

CALIFORNIA

Monterey County.—April 9, at Fort Ord, Area D, in a pool of 54 fleas from 23 mice (*Peromyscus* sp.); April 22, in a pool of 35 fleas from 2 ground squirrels (*C. beecheyi*), 1 shot and 1 found dead; August 3 and 4, in a pool of 236 fleas from 46 wood rats (*Neotoma* sp.), at Camp Hunter Liggett Military Reservation, San Antonio River; July 9, 12, 14, and 22, in pools of tissue from ground squirrels (*C. beecheyi*) taken at points distant from Monterey, as follows: 1 ground squirrel, and, proved separately, 10 ground squirrels, 12 miles east and 12 miles south; 10 ground squirrels, 20 miles east and 13 miles south; 9 ground squirrels, 18 miles east and 12 miles south.

[1] Public Health Reports, Dec. 4, 1941, p. 1879, and May 28, 1943, p. 850.

MONTANA

Garfield County.—April 4, in a pool of 173 fleas from 80 prairie dogs (*Cynomys ludovicianus*) taken on a ranch approximately 12 miles northwest of Jordan; April 5, in a pool of 79 fleas from 83 prairie dogs, same species, taken on a school section approximately 17 miles northwest of Jordan.

FOREIGN REPORTS

BRAZIL

Para State—Belém—Poliomyelitis.—For the period March 1 to July 31, 1943, a total of 47 confirmed cases of poliomyelitis was reported in Belém, Para State, Brazil, by months as follows: March, 1 case; April, 8 cases; May, 18 cases; June, 15 cases; July, 5 cases.

CANADA

Provinces—Communicable diseases—Week ended July 31, 1943.—During the week ended July 31, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox	1	32		27	63	13	34	10	31	211
Diphtheria	3	11	2	15	1	3		3		38
Dysentery (bacillary)				5						5
German measles				7	14	1		6	6	34
Influenza					9	2			4	15
Measles	8	5		89	458	26	45	119	86	836
Meningitis, meningococcus				1	4	1			1	7
Mumps		7		21	74	26	9	32	28	197
Poliomyelitis						1				1
Scarlet fever		3	4	37	36	6	11	15	25	137
Tuberculosis	7	4	6	146	53	19		1	27	263
Typhoid and paratyphoid fever				17	5	1				23
Undulant fever				2	1					3
Whooping cough		27		99	191	22	46	40	70	495

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

French West Africa—Dakar.—For the period July 21–31, 1943, 1 case of plague with 1 death was reported in Dakar, French West Africa.

Smallpox

Brazil—Bahia—Salvador.—For the week ended April 10, 1943, 2 cases of smallpox were reported in the port of Salvador, Bahia State, Brazil.

Turkey.—During the month of June 1943, 719 cases of smallpox (28 cases in Istanbul) were reported in Turkey.

Typhus Fever

Hungary.—For the week ended August 7, 1943, 6 cases of typhus fever were reported in Hungary.

Slovakia.—For the week ended July 31, 1943, 7 cases of typhus fever were reported in Slovakia.

Turkey.—For the month of June 1943, 785 cases of typhus fever were reported in Turkey.

Yellow Fever

Nigeria—Makurdi.—On July 22, 1943, 1 suspected case of yellow fever was reported in Makurdi, Nigeria.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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SURVEYS OF LIQUID WASTES FROM MUNITIONS MANUFACTURING

I. TRINITROTOLUENE (TNT) WASTES

By RUSSELL S. SMITH, *Public Health Engineer*, and W. W. WALKER, *Associate Sanitary Chemist, United States Public Health Service, Stream Pollution Investigations, Cincinnati, Ohio*

Many large munitions plants are being built in the United States to supply military needs under existing war conditions. Several of these plants will be manufacturing military explosives in unprecedented quantities and will discharge liquid wastes into watercourses. As there are no published data available on the quantity and character of the wastes to be expected from such manufacturing processes, the United States Public Health Service has made surveys of industrial waste at various types of plants manufacturing military explosives in order to obtain the data necessary for intelligent consideration of the effect of such wastes from any proposed plant on the receiving stream. These surveys were made by sending a mobile laboratory, built in an automobile trailer, to the plant under study. Flow measurements and samples were taken for at least seven 24-hour periods and the samples analyzed in the trailer laboratory.

In this paper, the first of a series of five reports, are presented data on industrial wastes gathered from surveys at three plants manufacturing di- and tri-nitrotoluene (DNT and TNT). The data concern only the actual liquid waste from the manufacture of this explosive. The flows from the power house areas, acid areas (where nitric acid is manufactured and sulfuric acid is reconcentrated), and any areas manufacturing other types of explosives have not been considered.

MANUFACTURING PROCESSES

The different processes in the manufacture of TNT may be summarized as follows:

(*a*) Nitration of toluene by treating it with a mixture of nitric and sulfuric acids under controlled temperature conditions. This is done in three stages, producing first mono-, then di-, and finally tri-nitrotoluene.

(*b*) Washing the product until it is free from acid.

(*c*) Graining or crystallizing.

(*d*) Purifying with sodium sulfite and washing to remove the beta- and gamma-trinitrotoluenes as water soluble sulfonates from the alpha-trinitrotoluene.
(*e*) Remelting, flaking, and packing.

A variable amount of the DNT is removed for use after the second stage of nitration, the remainder being carried to completion as TNT.

RAW MATERIALS

The principal raw materials are the toluene and the acids used in the nitration. The sulfuric acid is shipped to the plant, but the nitric acid is usually made on the plant site by the catalytic oxidation of anhydrous ammonia at high temperature and pressure. Sodium sulfite, which is used in the purification of the TNT, is usually made on the plant site by passing sulfur dioxide gas through a sodium carbonate solution.

CHARACTER OF WASTES

A plant for the manufacture of TNT consists of one or more "areas," each containing three "lines." The manufacturing is a batch process and the wastes from any one line fluctuate rapidly in appearance and character. Naturally, the larger the plant and the more areas involved, the less apparent are these fluctuations in the main waste flow.

There are two principal wastes from a plant of this type in addition to the cooling water from the nitrators, graining kettles, and the "fume recovery" or acid recovery house. These are the acid wash waters from the washing after nitration and the so-called "red water" from the sulfite purification and wash. The former is highly acid and has a decided yellow color. The red water from the purification is alkaline and has such an intense color (250,000 or more on the cobalt scale) that it appears black. As the final washings proceed, this red color fades rapidly. The acid waste and the red water are passed through catch tanks to settle out any particles of TNT that may be formed by postcrystallization as the wastes cool and then are usually mixed with the wasted cooling water for discharge to the receiving stream. If it were desirable for waste treatment purposes, the red water, either alone or with the acid wash, could be separated at the outlet of the catch tanks and piped to the treatment process, allowing the cooling water to be discharged directly to the stream. A composite sample of the waste, including the cooling water, over a period of several hours is clear, decidedly acid, and has a deep orange-red color.

FLOW MEASUREMENTS AND SAMPLING

Surveys were made in the TNT areas of three plants which are designated as plants "A," "B," and "C."

At plants "A" and "B" the waste flows were measured by means of a fully contracted rectangular weir set in an open ditch which

carried the waste waters from the entire TNT area. The head on the weir was measured to the nearest 0.01 ft. at regular intervals and the flow computed by standard weir formulae.

In order to obtain samples as representative as possible, an automatic sampler was built and installed in the ditch, well downstream from the weir. The stream was constricted somewhat to increase the velocity of flow and a paddle wheel about 4 feet in diameter was installed to turn with the current. Mounted on the rim of the wheel were two open stainless steel or copper cups with a hole about ¼ inch in diameter in the side. As these cups passed the top of their arc, a small part of the flow from this side hole entered a trough leading to the sample container. The wheel averaged about 17 r. p. m., thus collecting approximately 2,000 samples per hour. The sample container was changed every 2 hours and the samples combined into 12-hour or 24-hour composites, either uniformly or based on the calculated flows if there was any great flow variation. Sampling was done over a 24-hour period every other day for at least 2 weeks at each plant. In this way it was possible to obtain flow measurements and analytical results representative of a full week's operation at each plant. The 12-hour composite sample periods were from 8 a. m. to 8 p. m., designated as "day," and from 8 p. m. to 8 a. m., designated as "night." All analyses were made in a trailer laboratory of the United States Public Health Service which was set up within the grounds of the munitions plants.

The volume of cooling water used will vary with its temperature. Some plants may use well water for cooling, while others will use water from surface streams. If the cooling water comes from a surface supply, its temperature will vary greatly between winter and summer. For these reasons, the volume and strength of the wastes may vary greatly from one plant to another when considering the total flow from the TNT area.

At plant "C" it was found impractical to measure and sample the entire flow from the area. It was found, however, that the combined red water and acid wash from one line could be readily measured and sampled in a wood trough downstream from the catch tanks before being mixed with the cooling water. A shallow, suppressed weir was built in this trough and weir readings and samples were taken every 10 minutes for three 24-hour periods. The red water has a very intermittent flow, being discharged for 20 to 30 minutes every hour and a half. During one period of 12 hours, the time of start and stop of this flow was noted and depth measurements were made and samples taken every minute during the discharge. Flows were computed by the Chezy formula. From these data taken at plant "C" it is possible to determine the amount and character of

the waste per unit of production that might need treatment before discharge into a stream.

ANALYTICAL DETERMINATIONS

The following laboratory determinations were made on the composite samples of the waste: pH; oxygen consumed; color; threshold odor; sulfates; acidity, both methyl red and phenolphthalein; ammonia nitrogen; nitrite nitrogen; nitrate nitrogen; total solids, volatile and ash; and suspended solids, volatile and ash. Ammonia nitrogen and nitrate nitrogen determinations were not made on the plant "B" samples.

Where possible, all determinations were made in accordance with "Standard Methods of Analysis for Water and Sewage, Eighth Edition." The pH of the waste was determined potentiometrically using the glass electrode. Oxygen consumed was determined by digestion with potassium dichromate, instead of the more customary potassium permanganate, in accordance with the general practice of the Stream Pollution Investigations laboratory. Color was determined by the use of a standard color comparator using glass standards based on the cobalt scale, the readings being obtained by dilution of the waste with distilled water to bring the color within the range of the standards. Sulfates were determined gravimetrically by precipitation with barium chloride. This procedure would also precipitate sulfites, if present, and the amounts of sulfates reported may, therefore, be unduly high at times. Owing to the color of the waste, some difficulty was experienced in getting true end points when titrating for acidity, but pH measurements after titrating showed that the end points were in fair agreement. Nitrate nitrogen was determined by the reduction method. This determination includes nitrite and ammonia nitrogen as well. The latter two were obtained separately and the nitrate nitrogen obtained by subtraction. Nitrite nitrogen was measured colorimetrically and, although interference was encountered in a few cases during the work, satisfactory results were generally obtained. Ammonia nitrogen was determined by distillation into 0.1 normal acid.

Certain customary determinations could not be made on this waste. Because of the deep orange-red color, analyses for nitrate nitrogen by the disulfonic acid method, ammonia nitrogen with Nessler's reagent, and turbidity could not be made. It was found that dissolved oxygen determinations were impossible as some components of the wastes continued to liberate iodine in the final titration, giving erroneously high results. None of the standard modifications of the Winkler method nor other preliminary treatments that were tried would eliminate this interference. B. O. D. determinations were not made as routine work because trials in the field showed no B. O. D. in concentrations up to 5 percent even though the waste was neutralized and seeded.

RESULTS AND DISCUSSION

Tables 1, 2, and 3 show the analytical results for all samples taken at each plant, together with the average, maximum, and minimum results for the individual plant. Table 3A shows the analytical results for red water alone as found at plant "C." Table 4 presents a comparison of these results for the three plants surveyed and data on the average strength of the wastes for plants of this type. Table 5 shows the pounds of waste materials per 100,000 pounds of explosive produced at the various plants. The averages given in this table are the amounts of the various waste constituents that may be expected per 100,000 pounds of explosive produced (TNT plus DNT) from a TNT manufacturing plant (exclusive of the acid manufacturing area).

TABLE 1.—*Analytical results, plant "A"*

Sample date	Sample period	pH	Color	Odor concentration	p. p. m. Acidity: Methyl red	Acidity: Phenolphthalein	Oxygen consumed	SO_4	Nitrogen: NH_3	Nitrogen: NO_2	Nitrogen: NO_3	Total solids: Volatile	Total solids: Ash	Suspended solids: Volatile	Suspended solids: Ash
1	Day	2.4	8,000	64	214	504	870	617	5.7	10	106	1,085	1,325	18	110
	Night	2.4	7,500	128	200	424	750	535	4.4	16	76	933	1,097	12	55
2	Day	2.7	6,000	32	176	416	811	587	5.9	4	92	964	1,266	24	115
	Night	2.7	7,000	32	154	445	733	569	4.9	10	92	937	1,293	23	157
3	Day	2.7	6,000	32	127	420	718	518	5.4	15	137	955	1,345	25	242
	Night	2.7	6,000	64	113	339	747	527	4.5	20	120	920	1,160	7	90
4	Day	2.4	6,500	32	219	432	840	605	8.4	13	140	990	1,490	24	206
	Night	2.4	7,500	64	233	423	798	587	5.0	26	119	903	1,267	17	118
5	Day	2.4	9,000	64	283	441	926	604	5.4	13	103	1,106	1,290	24	121
	Night	2.3	9,000	32	343	505	923	667	5.1	20	99	1,160	1,240	22	143
6	Day	2.5	7,000	32	261	400	820	562	4.5	11	110	960	1,320	37	249
	Night	2.4	6,000	32	304	428	738	554	3.8	19	90	852	1,188	20	144
7	Day	2.0	7,500	64	623	783	702	806	5.9	14	124	1,090	1,250	31	135
	Night	2.0	7,000	32	676	823	759	972	5.7	24	88	1,190	1,300	25	128
Average		2.4	7,100	70	291	485	795	672	5.3	15	107	1,004	1,273	22	144
Maximum		2.7	9,000	128	676	823	926	972	8.4	26	137	1,190	1,490	37	249
Minimum		2.0	6,000	32	113	339	702	518	3.8	4	76	852	1,097	7	55

Table 4 reveals that there is a great difference in the strength of the wastes at different plants. Acidity, oxygen consumed, and volatile solids all show that the waste from plant "A" is considerably stronger than the waste from plant "B." Table 5 shows that the actual amounts of waste per unit of product were higher at "A" than at "B." The difference might be due to the fact that "A" was being operated at somewhat more than rated capacity, while "B" was slightly under capacity.

Waste flows at "B" were relatively considerably lower than at "A." This may be due to the fact that the water supply at "B" is

TABLE 2.—*Analytical results, plant "B"*

Sample date	Sample period	pH	Color	Odor concentration	p. p. m.: Acidity				Nitrogen			Total solids		Suspended solids	
					Methyl red	Phenolphthalein	Oxygen consumed	SO_4	NH_3	NO_2	NO_3	Volatile	Ash	Volatile	Ash
1	Day	2.8	6,750	16	100	133	738	668	....	23	....	826	1,290	14	12
	Night	2.8	8,000	16	87	115	730	652	....	32	....	907	1,236	....	....
2	Day	2.4	4,000	32	259	291	557	706	....	14	....	597	1,103	6	6
	Night	2.5	3,500	16	166	187	464	560	....	15	....	573	947	6	5
3	Day	2.8	8,500	8	112	162	543	563	....	12	....	620	1,060	13	7
	Night	2.6	7,000	8	183	218	550	622	....	24	....	678	1,082	9	4
4	Day	2.8	......	8	121	162	494	570	....	14	....	554	1,116	20	36
	Night	2.6	......	16	171	254	454	641	....	13	....	633	1,192	10	1
5	Day	2.5	5,500	8	204	280	498	733	....	25	....	573	1,270	20	31
	Night	2.6	4,750	8	151	205	516	594	....	22	....	728	1,090	11	4
6	Day	2.8	4,500	16	117	187	564	577	....	16	....	590	1,100	18	39
	Night	2.8	3,500	16	132	166	558	569	....	14	....	675	1,065	8	10
7	Day	3.1	6,000	32	56	121	620	590	....	20	....	760	1,163	24	29
	Night	3.2	7,000	16	61	120	618	558	....	....	....	836	1,100	17	3
8	Day	2.6	9,000	16	183	228	578	658	....	22	....	730	1,220	19	19
	Night	2.8	7,500	16	....	143	490	564	....	25	....	590	1,080	9	26
9	Day	2.9	8,000	16	90	119	435	526	....	20	....	730	1,070	14	9
	Night	2.8	7,000	16	92	125	506	497	....	21	....	750	1,060	17	20
Average		2.7	6,300	16	134	178	551	604	....	20	....	686	1,136	14	15
Maximum		3.2	9,000	32	259	291	738	733	....	32	....	907	1,290	24	39
Minimum		2.4	3,500	8	56	115	435	497	....	12	....	554	1,060	6	1

TABLE 3.—*Analytical results, plant "C" (concentrated waste from catch tanks)*

Sample date	Sampe period	pH	Color	Odor concentration	p. p. m.: Acidity				Nitrogen			Total solids		Suspended solids	
					Methyl red	Phenolphthalein	Oxygen consumed	SO_4	NH_3	NO_2	NO_3	Volatile	Ash	Volatile	Ash
1	24 hr	1.1	23,000	8	4,300	4,670	1,110	2,660	30	75	399	8,270	5,540	475	18
2	do	1.3	34,000	8	2,530	2,720	958	2,600	26	55	279	5,410	4,380	21	0
3	do	1.2	46,000	16	2,860	3,000	1,104	3,509	27	55	253	5,570	4,990	12	0
Average		1.2	34,000	11	3,230	3,460	1,057	2,923	28	62	310	6,417	4,970	169	6
Maximum		1.3	46,000	16	4,300	4,670	1,110	3,509	30	75	399	8,270	5,540	475	18
Minimum		1.1	23,000	8	2,530	2,720	958	2,600	26	55	253	5,410	4,380	12	0
Average 2 and 3		1.2	40,000	12	2,695	2,860	1,031	3,055	27	55	266	5,490	4,685	17	0

NOTE.—During first sampling day the catch tanks were cleaned and an unusual amount of suspended solids appeared in the waste.

TABLE 3A.—*Red water only, plant "C" (from catch tank)*

pH	Color	Odor concentration	p. p. m. Acidity		Alkalinity (methyl orange)	Oxygen consumed	SO_4	Nitrogen		Total solids[1]		Suspended solids	
			Methyl red	Phenolphthalein				NH_3	NO_2+NO_3	Volatile	Ash	Volatile	Ash
8.0	190,000	2	----	------	711	4,480	5,096	9.5	1,682	21,750	12,710	15	0

[1] Exploded on ignition; some of the ash lost.

TABLE 4.—*Average of analytical results*

Plant	pH	Color	Odor concentration	p. p. m. Acidity		Oxygen consumed	SO_4	Nitrogen			Total solids		Suspended solids	
				Methyl red	Phenolphthalein			NH_3	NO_2	NO_3	Volatile	Ash	Volatile	Ash
"A"	2.4	7,100	70	291	485	795	672	5.3	15	107	1,004	1,273	22	144
"B"	2.7	6,300	16	134	178	551	604	----	20	----	686	1,123	14	15
Average ("A" & "B")	2.6	6,700	43	212	332	673	638	5.3	18	107	850	1,198	18	80
"C" (no cooling water)	1.2	34,000	11	3,230	3,460	1,057	2,923	2.8	62	310	5,490	4,685	17	0

TABLE 5.—*Waste quantities*

	Waste per 100,000 pounds of explosive produced (TNT and DNT) Plant "A"	Plant "B"	Plant "C"	Average
Flow .... million gallons	1.17	1.08	----------	1.12
Free mineral acid as H_2SO_4 .... pounds	2,070	1,210	3,140	2,140
Sulfates .... do	5,560	5,450	2,840	4,620
NH_3 nitrogen .... do	49.7	----------	27.2	38.5
NO_2 nitrogen .... do	140	179	60	116
NO_3 nitrogen .... do	1,062	----------	302	684
Oxygen consumed .... do	8,360	4,990	1,055	4,800
Total solids:				
Volatile .... do	9,460	6,180	6,440	7,360
Ash .... do	12,240	10,220	4,980	9,150
Suspended solids:				
Volatile .... do	200	118	170	163
Ash .... do	1,380	130	6	505

from surface streams and the water temperatures were very low during the winter when the survey was made. It is expected that the flow per unit of product at plant "B" would increase considerably during the warm summer months.

As previously mentioned, the results at plant "C" are from sampling the concentrated wastes before they were diluted with the cooling

water. At a plant where it was considered necessary to treat the wastes before discharging them into a stream, these concentrated wastes could be readily collected separately and the uncontaminated cooling waters discharged without treatment. The survey showed that these concentrated wastes would average 117,000 gallons per 100,000 pounds of explosive. If it should be found possible to pass the yellow acid wash into the stream and treat only the "red water" or Sellite (sodium sulfite) wash, it would reduce the volume of waste to be treated to approximately 60,000 gallons per 100,000 pounds of explosive. Table 6 shows the pounds of waste products per 100,000 pounds of explosive that may be expected in the "red water."

TABLE 6.—*Waste quantities (red water only)*

	Waste per 100,000 pounds of explosive produced		Waste per 100,000 pounds of explosive produced
Flow .... million gallons..	0.0306	Total solids:	
Sulfates .... pounds..	1,300	Volatile .... pounds..	5,530
NH_3 nitrogen .... do....	2.4	Ash .... do....	3,240
NO_3 nitrogen .... do....	276	Suspended solids:	
NO_2 nitrogen .... do....		Volatile .... do....	4
Oxygen consumed .... do....	1,140	Ash .... do....	0

Tests were made at the National Institute of Health, United States Public Health Service, Bethesda, Md., of the toxicity of the concentrated waste as obtained from plant "C." The waste was brought to a pH of 7, made isotonic with sodium chloride, and sterilized in an autoclave for 1 hour. Two mice were each given a ½-ml. intraperitoneal injection of the sterilized waste and a guinea pig was given 2 ml. intraperitoneally. A rabbit was given an intravenous injection of 15 ml. and observed for any temperature rise. All results were negative and the animals showed no ill effects from the different injections. Apparently the waste is nontoxic to warm-blooded animals.

SUMMARY

Waste surveys were made at three plants manufacturing trinitrotoluene. Tables present the average concentration of various constituents of the wastes for plants of this type and the average amounts of various constituents of the wastes to be expected per unit of product.

The waste is generally clear, highly colored, strongly acid, and a high percentage of the solids present are volatile. It has a noticeable chemical odor and a taste best described as "acid." Apparently it is very stable. It does not readily decompose in the stream, nor does it seem to combine with other materials to be found in the normal stream used for water supply to intensify taste and odor troubles. The color apparently cannot be removed by means of coagulation methods

normally used in water treatment and can only be reduced or eliminated by means of adequate dilution. The waste in a concentration of ½ percent in filtered and chlorinated Ohio River water gave no odor and a barely perceptible "acid" taste. There was, however, a very noticeable increase in color. The waste is apparently nontoxic to warm-blooded animals.

II. SMOKELESS POWDER WASTES

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This paper presents data on industrial wastes gathered from a survey of three plants manufacturing smokeless powder for use as a propellant.

MANUFACTURING PROCESSES

The different processes used in the manufacture of nitrocellulose (pyro smokeless) powder may be summarized as follows:

(*a*) Nitration of purified cotton linters by treating with a mixture of nitric and sulfuric acids to produce a cellulose nitrate or "pyrocotton."

(*b*) Purification of pyrocotton by boiling, macerating, and washing to remove all traces of free acids, unnitrated cellulose, nitrated oxy- and hydrocellulose, and cellulose sulfate.

(*c*) Mixing of pyrocotton with ether-alcohol and a stabilizer and pressing to form a colloid.

(*d*) Granulating of the powder by pressing the colloid through steel dies.

(*e*) Final processes of solvent recovery, drying, and blending.

The completed powder is shipped to other locations for loading into silk bags, cartridges, and field artillery shells.

RAW MATERIALS

The principal raw materials used in the process are cotton, nitric acid, sulfuric acid, and alcohol. The cotton is received at the plant as purified cotton linters, the cotton having been purified elsewhere by digesting, washing, and bleaching. The sulfuric acid is shipped to the plant and the nitric acid is made on the plant site by the catalytic oxidation of ammonia at high temperature and pressure. Both methyl and ethyl alcohols are used. The methyl alcohol is used to make methylamine and the ethyl alcohol for dehydration of pyrocotton and for the manufacture of ether for use in colloiding.

Other raw materials used in smaller amounts include diphenylamine used as a stabilizer, caustic soda used for scrubbing in the ether production and for neutralization in the production of diphenylamine, and soda ash used for neutralization in the process of powder production. The diphenylamine is made at the plant from benzene.

CHARACTER OF WASTES

There are four principal wastes from a plant producing smokeless powder. These are: (1) the acid that is lost from the wringers after nitrating the cotton and purifying the pyrocotton; (2) gun cotton lost in white water from the boiling and poaching; (3) alcohol wastes slightly contaminated with ether lost from the solvent recovery and the water dry; and (4) aniline from the manufacture of diphenylamine. The white water from the boiling and poaching tubs and the beaters is recirculated through a "save-all" or settling tank, thus reducing the cotton losses. The aniline is settled out with an iron sludge in a separate basin and the sludge removed and sent to aniline manufacturers for aniline recovery. There are also the cooling, condensing, and ash sluicing waters from the power house and acid manufacturing area, but these may usually be separated from the other wastes, put through a pond to settle out the ash, and then admitted to the receiving stream essentially as an uncontaminated flow.

Engineers of the du Pont Company have stated that the wastes mentioned above would represent losses of approximately 89,500 pounds of acid (mixed sulfuric and nitric), 2,500 pounds of alcohol, and 125 pounds of cotton per 100,000 pounds of powder produced and that the waste flow, including cooling and condensing water, would be 8.3 million gallons per 100,000 pounds of powder. It was also stated that if all the aniline escaped from the iron sludge it would amount to 23 pounds per 100,000 pounds of powder.

FLOW MEASUREMENTS AND SAMPLING

When the survey was made at plant "A" the entire plant was not in operation and no diphenylamine was being manufactured, but it was felt that results obtained would be fairly representative of normal plant operation. The waste water from the power house (condensing and ash sluicing flows) was diverted to a different watercourse from the manufacturing wastes and was not included in the survey. It was estimated by the plant operating officials that this power house flow amounted to about 3 million gallons per 100,000 pounds of powder, but no measurements were available. A fully contracted rectangular weir was installed in a ditch carrying the entire waste flow of the plant. Samples were taken and the head on the weir was read every 40 minutes over a 24-hour period every other day for 2 weeks. The individual samples were made into 24-hour composite samples for the laboratory. Flows were computed from the individual weir readings and averaged to obtain the daily flow.

At plant "B" the waste flow was divided into several sewers and it was necessary to establish eight sampling and measuring points. The sewers varied in size from 12″ to 48″ and were generally on steep grades with a high velocity of flow. Due to the conditions encoun-

tered, it was considered inadvisable to try to construct weirs and all flows were computed from the size and slope of the sewer and the depth of flow. Samples were taken and flow measurements were made every 90 minutes at each sampling point every other day for 2 weeks. The individual samples were composited on the basis of flow into a 24-hour sample for each sampling point and these samples composited into a 24-hour sample for the entire plant on the basis of the average flow at the individual sampling points. The analytical results as recorded are from these "plant" samples.

At plant "C" the wastes from the power house-acid manufacturing area, the nitrocotton or pyrocotton area, and the finishing area were discharged into separate sewers. This complete separation of wastes from various parts of the plant made it practicable to make determinations of the individual wastes, which was not done at the other plants. Sufficient samples were taken of the waste from the power house-acid area to be certain that it was essentially cooling water without serious contamination that could be discharged into the ordinary stream without damage. A few flow measurements were made in order to make an estimate of the flow per unit of production.

Depth measurements were made in and samples taken from the sewer from the pyrocotton area every 20 minutes every other day for over 2 weeks. Flows were computed by the Chezy formula and the individual samples composited on the basis of measured flows into 24-hour samples. A fully contracted weir with a 7-foot crest and an automatic paddle wheel sampler were installed in the ditch carrying the discharge from the finishing area. Weir readings were taken every 3 hours and the 3-hour samples composited according to flow into 24-hour composite samples every other day over a period of 2 weeks. All analyses were made on the 24-hour samples.

ANALYTICAL DETERMINATIONS

All of the analytical work was done in a trailer laboratory of the United States Public Health Service. The following laboratory determinations were made on the composite samples: pH; color; odor concentration; acidity, methyl red and phenolphthalein; 5-day biochemical oxygen demand (B. O. D.); oxygen consumed; sulfates; nitrite nitrogen; nitrate nitrogen; total solids, volatile and ash; suspended solids, volatile and ash; and soap hardness.

Where possible, all determinations were made in accordance with "Standard Methods of Analysis for Water and Sewage, Eighth Edition." Oxygen consumed was determined by digestion with potassium dichromate, instead of the more customary potassium permanganate, in accordance with the general practice of the Stream Pollution Investigations laboratory. Color was determined by use of a standard color comparator using glass standards based on the

cobalt scale. Sulfates were determined gravimetrically by precipitating with barium chloride. All B. O. D. determinations were made on samples neutralized and then seeded with river water.

Determinations of color, odor concentration, total solids, and soap hardness were not made at plant "A" during this survey. However, some samples taken at a later date, when the plant was in nearly complete operation, showed an average color of 228 and odor concentration of 180.

RESULTS AND DISCUSSION

Tables 1, 2, 3A, and 3B show the analytical results for the 24-hour composite samples at the three plants studied. Table 4 presents a ready comparison of the averages of the analytical results obtained at the different plants.

TABLE 1.—*Analytical results, plant "A"*

Sampling day	pH	p. p. m.								
		Acidity		5-day B.O.D.	Oxygen consumed	SO_4	Nitrogen		Suspended solids	
		Methyl red	Phenolphthalein				NO_2	NO_3	Volatile	Ash
1	<1.6	2,460	2,540	57.6	74.8	1,761	1.00	500	30	39
2	<1.6	1,830	2,110	[1] 1.9	71.6	1,325	5.00	200	24	22
3	<1.6	2,400	2,440	43.6	72.8	1,609	2.00	600	24	23
4	1.6	1,670	1,790	51.2	81.0	1,156	2.20	600	26	19
5	1.7	1,280	1,690	37.2	75.9	1,053	2.20	600	42	18
6	<1.6	1,340	1,680	62.8	75.7	1,025	4.00	600	25	13
7	<1.6	1,350	1,660	42.4	78.6	1,033	2.30	600	31	33
Average	<1.6	1,560	1,990	49.1	76.2	1,280	2.70	530	29	24
Maximum	1.7	2,460	2,540	62.8	81.0	1,761	5.00	600	42	39
Minimum	<1.6	1,280	1,660	37.2	71.6	1,025	1.00	200	24	13

[1] Not included in average.

TABLE 2.—*Analytical results, plant "B"*

Sampling day	pH	Color	Odor concentration	p. p. m.											Soap hardness
				Acidity		5-day B. O. D.	Oxygen consumed	SO_4	Nitrogen		Total solids		Suspended solids		
				Methyl red	Phenolphthalein				NO_2	NO_3	Volatile	Ash	Volatile	Ash	
1	<1.6	45	16	1,990	2,130	57.0	152.0	1,422	1.5	600	430	490	70	375	322
2	<1.6	60	32	1,740	1,640	50.0	89.0	1,138	2.2	600	1,340	140	66	23	163
3	<1.6	35	64	1,290	1,380	[1] 813+	94.4	967	1.8	400	945	425	33	31	224
4	<1.6	70	16	1,880	1,960	49.2	106.0	1,460	2.6	450	175	585	52	40	478
5	<1.6	----	4	1,260	1,560	52.1	111.0	930	1.5	320	674	506	86	341	198
6	<1.6	45	8	1,820	1,950	44.9	105.0	1,275	2.0	540	200	270	52	149	193
7	<1.6	45	32	1,910	1,800	50.1	92.8	1,260	2.4	600	545	320	35	72	288
8	<1.6	70	8	1,130	1,240	44.3	90.0	860	2.0	520	1,060	300	49	160	171
9	1.7	50	8	810	848	33.7	58.4	590	1.5	200	796	154	33	36	132
Average	<1.6	53	21	1,540	1,610	47.6	99.8	1,100	1.9	470	687	354	54	136	241
Maximum	1.7	70	64	1,990	2,130	57.0	152.0	1,460	2.6	600	1,340	585	86	375	478
Minimum	<1.6	35	4	810	848	33.7	58.4	590	1.5	200	175	140	33	23	132

[1] Not included in average.

TABLE 3A.—*Analytical results, plant "C", pyrocotton area*

Sampling day	pH	Color	Odor concentration	p. p. m. Acidity Methyl red	Acidity Phenolphthalein	5-day B. O. D.	Oxygen consumed	SO_4	Nitrogen NO_2	Nitrogen NO_3	Total solids Volatile	Total solids Ash	Suspended solids Volatile	Suspended solids Ash	Soap hardness
1	1.4	50	4	2,580	3,080	31.7	118	2,105	1.5	600	2,900	1,110	48	4	1,500
2	1.2	40	4	3,430	3,500	43.8	86	2,208	2.4	700	3,060	250	31	10	341
3	1.2	30	8	3,950	4,130	59.4	98	2,540	2.1	850	3,420	220	29	5	368
4	0.9	45	4	6,200	6,330	54.7	104	2,210	3.0	1,000	5,932	248	31	6	322
5	1.0	35	2	4,450	4,520	75.8	119	1,800	2.8	1,200	3,604	196	31	4	299
6	1.0	30	4	5,190	5,290	40.8	93	2,600	4.0	900	4,710	300	23	8	622
7	0.9	30	2	5,160	5,290	59.9	109	2,680	3.2	1,500	4,777	243	25	15	511
8	1.3	25	1	3,050	3,080	52.8	118	1,970	2.0	1,000	3,010	200	78	6	248
Average	1.1	36	3.6	4,250	4,400	52.3	106	2,265	2.6	970	3,930	346	37	7	526
Maximum	1.4	50	8	6,200	6,330	75.8	119	2,680	4.0	1,500	5,932	1,110	78	15	1,500
Minimum	0.9	25	1	2,580	3,080	31.7	86	1,800	1.5	600	2,900	196	23	4	248

TABLE 3B.—*Analytical results, plant "C", finishing area*

Sampling day	pH	Color	Odor concentration	p. p. m. Acidity	Alkalinity (methyl orange)	5-day B. O. D.	Oxygen consumed	SO_4	Nitrogen NO_2	Nitrogen NO_3	Total solids Volatile	Total solids Ash	Suspended solids Volatile	Suspended solids Ash	Soap hardness
1	8.2	70	64	------	66	59.3	52	<1.0	2.2	30	72	118	13	16	51
2	8.4	100	16	------	67	68.6	51	<1.0	3.2	9	50	140	14	70	54
3	8.9	110	16	------	80	83.4	66	<1.0	2.8	6	66	120	11	25	77
4	8.0	110	16	------	86	59.5	44	<1.0	1.0	3	61	122	15	22	52
5	8.9	110	64	------	80	77.0	56	<1.0	2.8	6	94	108	14	13	48
6	8.7	105	32	------	74	65.6	58	<1.0	3.2	6	86	132	15	20	48
7	6.8	120	8	------	43	62.8	42	8.0	1.4	4	52	118	13	31	38
8	7.9	110	16	------	47	105.0	124	<1.0	2.0	5	67	115	10	13	35
Average	8.2	104	29	------	68	83.9	62	1.0	2.3	9	69	122	13	26	50
Maximum	8.9	120	64	------	86	195.0	124	8.0	3.2	30	94	140	15	70	77
Minimum	6.8	70	8	------	43	59.3	42	<1.0	1.0	4	50	108	10	13	35

TABLE 4.—*Average analytical results*

Plant	pH	Color	Odor concentration	p. p. m. Acidity Methyl red	Acidity Phenolphthalein	5-day B. O. D.	Oxygen consumed	SO_4	Nitrogen NO_2	Nitrogen NO_3	Total solids Volatile	Total solids Ash	Suspended solids Volatile	Suspended solids Ash	Soap hardness
"A"	<1.6	----	----	1,860	1,990	49.1	76.2	1,280	2.7	530	------	------	39	24	----
"B"	<1.6	53	21	1,540	1,610	47.6	99.8	1,100	1.9	470	687	354	54	136	241
"C"—combined flow	----	52	----	2,820	2,970	62.9	91.4	1,512	2.4	650	2645	229	29	13	368
"C"—pyrocotton	1.1	36	4	4,250	4,400	52.3	106.0	2,265	2.6	970	3,930	346	37	7	526
"C"—finish	8.2	104	29	------	------	83.9	62.0	1	2.3	9	69	122	13	26	50

As previously mentioned, at plant "C" the wastes from the pyrocotton area and the finishing area were discharged separately. The results of the analyses of these wastes as given in tables 3A and 3B show that the waste from the finishing area would not be a serious problem from the viewpoint of possible stream pollution. The waste has a 5-day B. O. D. that is lower than that of the effluents of many plants which give only primary treatment to domestic sewage. Unless this waste would constitute a large portion of the total flow in the receiving stream it would seem unnecessary to give it any treatment. If treatment should be needed, it could probably be done successfully on trickling filters. The waste from the pyrocotton area is strongly acid and in most cases would require neutralization before discharge into a stream.

The averages of the analytical results as given in table 4 show a reasonable agreement among the different plants. It is to be noted, however, that there is a wide variation from day to day in the results at any one plant. Although not shown on these tables, there is a considerable variation in the average daily flow from these plants. These variations in quantity and strength of the wastes are much more noticeable in the individual samples taken during the course of a day than in the composite samples. This variation is shown by the following data obtained at plant "A":

Sampling time	Methyl red acidity, p. p. m.	Relative flow	Sampling time	Methyl red acidity, p. p. m.	Relative flow
7 a. m.	206	1.00	11 a. m.	790	1.12
7:40 a. m.	231	1.33	11:40 a. m.	1,340	1.33
8:20 a. m.	262	1.40	12:20 p. m.	1,350	1.40
9 a. m.	42	1.73	1 p. m.	690	1.69
9:40 a. m.	161	1.09	1:40 p. m.	530	2.04
10:20 a. m.	586	1.60			

At plant "C" samples of the flow from the pyrocotton area taken at 5-minute intervals from 8:50 a. m. to 12:45 p. m. showed a variation in methyl red acidity from 2,470 p. p. m. to 4,640 p. p. m. with an average of 3,370 p. p. m. These results clearly indicate the advisability of providing an adequate lagoon or balancing pond in connection with any treatment plant installed for the neutralization of the acid wastes from the pyrocotton area. In case neutralization before discharge is not considered necessary, such a balancing pond would help to eliminate sudden flushes of strong acid that might be harmful to the receiving stream.

Table 5 shows the waste quantities per unit of production for the three plants. It is very noticeable that the waste quantities per unit of production are much higher at plant "C" than at the other two plants. This is particularly true for the quantity of acid lost

and those items, such as sulfates and nitrate nitrogen, that would vary with the amount of acid in the waste. Production figures show that plant "C" used more acid per pound of powder produced than did plant "B." The reason for this variation is not known.

TABLE 5.—*Waste quantities*

	Waste per 100,000 pounds of powder produced			
	Plant "A"	Plant "B"	Plant "C"	Average
Flow .... million gallons..	4.68	4.18	7.25	5.37
Free mineral acid as H_2SO_4 .... pounds..	77,300	53,900	169,000	100,000
Sulfates .... do....	49,800	38,400	91,300	59,800
Nitrite nitrogen .... do....	105	66	152	108
Nitrate nitrogen .... do....	20,800	16,400	39,400	25,500
Total solids:				
Volatile .... do....	....	24,000	158,000	91,000
Ash .... do....	....	12,340	15,900	14,200
Suspended solids:				
Volatile .... do....	1,130	1,880	1,800	1,600
Ash .... do....	900	4,740	815	2,150
Oxygen consumed .... do....	2,970	3,480	5,520	3,990
5-day B. O. D .... do....	1,880	1,660	3,840	2,460
Population equivalent (B. O. D.)	11,100	9,760	22,600	14.500
Total hardness as $CaCO_3$ .... pounds..	....	8,400	21,600	15,000

SUMMARY

Waste surveys were made at three plants manufacturing smokeless powder. Tables present the average concentrations of various constituents of the wastes for plants of this type and the average amounts of these waste products to be expected per unit of product.

Plants of this type have a very large volume of liquid waste. This waste is very strongly acid and high in sulfates and nitrate nitrogen. Except for this acidity, the waste would have less deleterious effect on the receiving stream than the same volume of domestic sewage that had received primary treatment.

TWENTY-YEAR SURVIVAL OF VIRULENT *BACILLUS PESTIS* CULTURES WITHOUT TRANSFER [1]

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The present paper concerns a strain of *Bacillus pestis* which retained viability and virulence during 20 years of storage at 10° C. on the slanted surface of beef infusion agar tubes without transfer. The strain P 4–7 was originally isolated from a California ground squirrel (*Citellus beecheyi*) at the plague laboratory of the United States Public Health Service in San Francisco, from which it was received December 11, 1922, at the National Institute of Health, in Washington, D. C.

During 1923 and 1924 the strain was passed through guinea pigs in

[1] From the Division of Infectious Diseases, National Institute of Health.

Washington every 2 or 3 months. At time of each guinea pig passage a culture was isolated by inoculating a few drops of heart blood to the slanted surface of plain beef infusion agar having water of condensation. Each tube thus inoculated was subcultured a few days later to a plain beef infusion agar slant which in turn was subcultured to a third slant, all bearing water of condensation. Thus one-third of the tubes bore the inoculation blood and two-thirds were free from blood but the presence or absence of blood did not affect the longevity of cultures. After growth appeared, the cotton stoppers were discarded and each tube was forcibly plugged with a tight-fitting cork stopper soaked in a hot mixture of half paraffin and half vaseline heated in an open dish to the boiling point of about 250° C. This prevented any evaporation and allowed the water of condensation to remain undiminished 20 years. Forty-eight tubes of the P 4–7 strain were stored at 10° C. in 1923 and 40 in 1924 (the 1924 series awaits test in some future year).

SURVIVAL AFTER 20 YEARS OF STORAGE

On April 23, 1943, the 48 tubes of the 1923 series were subcultured each to a horse meat infusion agar slant, of which 33 showed growth in 2 to 7 days, while 15 failed to grow. The growths from the 33 positive tubes were tested for virulence by injection, each into a guinea pig subcutaneously on the abdomen using a loopful of solid growth for each pig. The results follow: (1) Eleven of the 33 pigs survived and were killed at the end of 2 weeks without having shown effects greater than slight thickening at the site of inoculation or slight enlargement of inguinal lymph nodes. (2) Thirteen died near the end of the first week without showing significant gross change in spleen nor caseation of inguinal lymph nodes. (3) Three were found dead near the end of the first week, showing lesions of acute plague, i. e., edema, hemorrhage and necrosis at site of inoculation, enlarged spleen studded throughout with focal necroses, enlarged caseous inguinal glands, and great numbers of bipolar typical *B. pestis* in smears of spleen and glands. (4) Six were killed for culturing when dying near the end of the first week and *B. pestis* was isolated from the heart blood of each. Their sites of inoculation, spleens, and inguinal glands showed typical gross lesions of acute plague and great numbers of *B. pestis* in smears.

SURVIVAL AFTER 10 YEARS OF STORAGE

Culture tube No. 44 of the 1923 series of strain P 4–7, when tested by Francis (*1*) in 1932 after 9 years of storage without transfer, was found to grow readily on beef infusion agar, to give the sugar fermentations typical of plague, and to be of maximum virulence for guinea pigs and white rats.

Cultures of four other strains (Hill 1932, Ruiz 1933, Lakeview 1934, and Siam 1939) were stored at 10° C. at time of isolation on beef infusion agar slants and were subcultured for the first time in April 1943 on horse meat infusion agar slants. All grew in 48 hours; their sugar fermentations were unchanged since original isolation and were typical of plague. The virulence for guinea pigs of Ruiz after 10 years, Lakeview after 9 years, and Siam after 4 years was maximum while the Hill strain was nonvirulent after 11 years.

Wilson (*2*) reported a plague culture as viable and virulent after remaining unopened for 10 years and 5 months.

TABLE 1.—*Virulence of plague cultures stored at 10° C.*

Strain	Date of isolation	Animal source	Place of origin	By whom isolated	Killed guinea pigs in days	Years since last transfer
P 4-7	June 10, 1923	California ground squirrel.	California	Plague Laboratory, San Francisco.	4, 5, 6, 7, 8, 9	9
					4, 5, 6, 6, 7, 8	20
Hill	Apr. 8, 1932	Norway rat	Los Angeles.	L. V. Dieter	nonvirulent	11
Ruiz	Aug. 4, 1933	Man	Peru	E. Francis	4, 5, 5, 7, 7, 8	10
Lakeview	May 21, 1934	do	Oregon	W. Levin	5, 6, 6, 6, 7, 7	9
Siam	July 26, 1939	Unknown	Siam	E. Francis	5, 6, 6, 7, 7	4

Acute virulence as recorded in table 1 consisted of severe local edema at site of inoculation, caseation of enlarged inguinal lymph nodes, and small nodules of focal necrosis studded over the spleen. Smears of the lesions showed typical bipolar bacilli, and cultures from heart blood yielded *B. pestis.*

Fermentation of sugars.—The sugar reactions of the five strains were uniform but glycerin was fermented only by the Siam strain. The latter arrived at Washington on July 26, 1939, by air mail from Bangkok, Siam, in a guinea pig spleen in 20 percent glycerin. The original source of the strain was not stated but at that time 89 cases of plague were reported from Siam. Fermentation tests were made in the semisolid medium proposed by Enlows (*3*) which is composed of water, peptone, potassium and sodium salts, agar 0.15 percent, brom thymol blue as an indicator, and the fermentable substance.

The fermentation reactions were as follows: (1) Fermentation with production of acid but no gas in dextrose, levulose, mannose, mannitol, xylose, trehalose, salicin, maltose, and galactose; (2) slight fermentation of arabinose, dextrin, and starch; (3) no fermentation of saccharose, lactose, amygdalin, dulcitol, erythritol, inositol, inulin, raffinose, rhamnose, sorbitol, adonitol or litmus milk; gelatin was not liquefied.

CONCLUSION

Bacillus pestis retained viability and virulence for 10 and 20 years on slants of beef infusion agar stored at approximately 10° C. without transfer.

REFERENCES

(*1*) Francis, Edward: Duration of viability and virulence of *Bacillus pestis*. Pub. Health Rep., 47: 1287–1294 (June 10, 1932).
(*2*) Wilson, R. J.: The viability of the *Bacillus pestis* in stock cultures. Proceedings of the New York Pathological Society, 13: 149–150 (December 1913).
(*3*) Enlows, E. M. A.: A sugar-free medium for fermentation studies. Pub. Health Rep., 38: 2129–2132 (September 14, 1923).

DEATHS DURING WEEK ENDED AUGUST 28, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 28, 1943	Corresponding week, 1942
Data from 90 large cities of the United States:		
Total deaths	7,784	7,400
Average for 3 prior years	7,287	
Total deaths, first 34 weeks of year	315,665	288,331
Deaths under 1 year of age	632	613
Average for 3 prior years	547	
Deaths under 1 year of age, first 34 weeks of year	22,495	19,316
Data from industrial insurance companies:		
Policies in force	65,764,051	64,982,742
Number of death claims	10,974	10,061
Death claims per 1,000 policies in force, annual rate	8.7	8.1
Death claims per 1,000 policies, first 34 weeks of year, annual rate	10.0	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 4, 1943

Summary

The incidence of poliomyelitis increased to a total of 956 cases for the current week, as compared with 872 for the preceding week and a 5-year (1938–42) median of 479. The current total is higher than that for the corresponding week of any other year since 1935, when 1,088 cases were reported—the peak week of that year. States reporting the largest numbers currently (last week's figures in parentheses) are as follows: *Increases*—Kansas 90 (66), Utah 76 (13), New York 58 (42), Connecticut 44 (39), Iowa 33 (13), Missouri 30 (24), Massachusetts 20 (8); *decreases*—Illinois 192 (194), California 114 (138), Texas 62 (75), Colorado 20 (21).

The cumulative total for the first 35 weeks of the year is 5,887, as compared with 1,902 for the same period of last year and a 5-year median of 3,009. The total for the first 35 weeks of 1935 was 5,417, or 50 percent of the total for that year.

A total of 151 cases of meningococcus meningitis was reported, as compared with 166 for the preceding week and a 5-year median of 26. The largest number recorded for a corresponding week of the past 16 years was 87 cases, reported in 1930. The largest numbers reported currently (last week's figures in parentheses) are as follows: New York 19 (25), Pennsylvania 14 (18), California 14 (15), Michigan 13 (7), and Illinois 12 (8). The cumulative total for the first 35 weeks of the year is 13,845, as compared with 2,495 for the same period last year and a 5-year median of 1,470.

The incidence of diphtheria, influenza, measles, typhoid and paratyphoid fever, and whooping cough was slightly below that for the preceding week, while the figures for scarlet fever were slightly higher (821 cases, as compared with 767 last week and a 5-year median of 683). Only 7 cases of smallpox were reported, as compared with none last week and a 5-year median of 16.

Deaths recorded in 89 large cities of the United States totaled 7,812, as compared with 7,754 for the preceding week and 7,472 for the average of the past 3 years. The cumulative figure for the first 35 weeks of the year is 322,451, as compared with 294,979 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended September 4, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42
	Sept. 4, 1943	Sept. 5, 1942		Sept. 4, 1943	Sept. 5, 1942		Sept. 4, 1943	Sept. 5, 1942		Sept. 4, 1943	Sept. 5, 1942	
NEW ENGLAND												
Maine	0	0	1	------	------	------	1	16	15	2	1	0
New Hampshire	0	0	0	------	------	------	0	1	0	0	0	0
Vermont	1	0	0	------	------	------	1	29	3	0	0	0
Massachusetts	0	1	1	------	------	------	24	46	38	4	2	0
Rhode Island	0	0	0	------	------	------	8	5	3	3	0	0
Connecticut	1	0	0	------	3	------	9	15	13	4	0	0
MIDDLE ATLANTIC												
New York	5	10	8	[1] 2	[1] 4	[1] 1	100	42	57	19	8	2
New Jersey	2	2	1	2	3	3	65	12	13	1	1	0
Pennsylvania	3	4	7	------	1	------	30	15	40	14	3	2
EAST NORTH CENTRAL												
Ohio	5	10	10	------	5	4	27	31	14	8	1	1
Indiana	8	0	5	12	8	3	1	0	3	1	1	1
Illinois	5	14	10	3	2	6	22	10	10	12	3	1
Michigan [2]	6	6	6	1	2	------	86	16	16	13	0	1
Wisconsin	2	0	0	11	11	11	93	36	43	1	1	0
WEST NORTH CENTRAL												
Minnesota	3	1	2	------	1	1	16	5	5	2	1	0
Iowa	5	1	2	------	------	------	2	10	10	1	0	0
Missouri	0	3	6	1	------	------	9	4	2	5	3	0
North Dakota	1	1	2	13	5	1	13	3	3	1	0	0
South Dakota	2	3	1	------	------	------	7	3	3	0	0	0
Nebraska	4	1	0	------	------	------	0	3	2	0	0	0
Kansas	2	7	3	------	------	------	5	8	8	1	1	0
SOUTH ATLANTIC												
Delaware	1	0	0	------	------	------	0	0	0	1	0	0
Maryland [2]	1	3	1	1	4	2	17	7	4	0	2	1
District of Columbia	0	2	2	------	------	------	3	1	2	2	0	0
Virginia	5	5	15	30	44	12	7	1	4	0	1	1
West Virginia	5	1	5	------	1	3	9	0	1	2	3	1
North Carolina	27	45	45	------	------	------	10	5	12	4	2	1
South Carolina	9	12	10	152	58	90	4	0	3	1	0	0
Georgia	0	13	18	5	18	18	7	1	4	0	0	0
Florida	6	1	8	11	3	3	0	11	4	4	0	0
EAST SOUTH CENTRAL												
Kentucky	7	4	9	2	3	2	10	2	2	3	1	1
Tennessee	3	8	6	2	5	5	8	3	3	1	0	0
Alabama	6	20	18	16	26	6	5	16	16	5	0	1
Mississippi [2]	12	7	12	------	------	------	------	------	------	0	0	0
WEST SOUTH CENTRAL												
Arkansas	0	11	11	1	2	3	6	1	4	1	0	0
Louisiana	2	2	5	1	5	3	0	1	1	2	0	1
Oklahoma	1	3	7	11	1	5	11	1	2	2	0	0
Texas	18	20	25	226	103	103	46	21	27	6	2	2
MOUNTAIN												
Montana	0	2	2	------	------	------	24	10	10	0	0	0
Idaho	0	0	0	------	------	------	1	8	3	0	0	0
Wyoming	0	0	0	------	13	1	4	3	8	0	0	0
Colorado	14	3	4	11	3	3	14	4	7	0	0	0
New Mexico	1	0	1	2	------	------	4	0	1	0	1	0
Arizona	0	9	0	35	28	28	4	4	4	0	0	0
Utah [2]	0	0	0	1	3	------	2	19	8	0	0	0
Nevada	0	0	------	------	------	------	0	1	------	1	0	------
PACIFIC												
Washington	1	5	1	1	------	------	17	44	6	5	0	0
Oregon	6	1	1	2	3	4	12	49	10	5	1	0
California	18	7	10	10	20	12	54	62	62	14	2	0
Total	198	248	248	565	388	383	808	585	650	151	41	26
35 weeks	7,696	7,871	9,231	82,813	81,658	152,280	539,146	467,858	467,858	13,845	2,495	1,470

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 4, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Sept. 4, 1943	Sept. 5, 1942		Sept. 4, 1943	Sept. 5, 1942		Sept. 4, 1943	Sept. 5, 1942		Sept. 4, 1943	Sept. 5, 1942	
NEW ENGLAND												
Maine	1	0	0	13	3	1	0	0	0	1	2	2
New Hampshire	1	0	0	2	2	1	0	0	0	1	0	0
Vermont	0	0	0	1	1	1	0	0	0	0	0	0
Massachusetts	20	1	2	47	62	28	0	0	0	2	7	4
Rhode Island	11	1	1	4	6	2	0	0	0	0	1	0
Connecticut	44	6	2	8	15	6	0	0	0	1	2	4
MIDDLE ATLANTIC												
New York	58	19	20	66	52	46	0	0	0	13	9	12
New Jersey	9	21	10	14	24	19	0	0	0	5	2	4
Pennsylvania	5	3	13	41	43	43	0	0	0	18	19	19
EAST NORTH CENTRAL												
Ohio	18	17	17	66	53	34	1	0	0	14	13	12
Indiana	3	7	6	11	7	23	0	1	0	1	9	9
Illinois	192	36	20	53	30	55	6	0	1	6	10	16
Michigan [2]	18	12	26	42	22	41	0	0	0	6	10	10
Wisconsin	18	3	7	35	53	42	0	1	0	1	1	1
WEST NORTH CENTRAL												
Minnesota	11	3	6	22	16	15	0	0	3	0	0	0
Iowa	33	1	1	13	18	17	0	0	0	2	0	2
Missouri	30	4	4	8	11	14	0	1	1	3	9	9
North Dakota	2	1	1	2	2	3	0	0	0	0	0	0
South Dakota	0	1	1	11	9	9	0	0	0	0	1	0
Nebraska	17	0	0	3	5	3	0	0	0	0	0	1
Kansas	90	5	3	18	20	27	0	0	0	5	1	4
SOUTH ATLANTIC												
Delaware	3	0	0	1	2	2	0	0	0	0	2	1
Maryland [2]	0	2	1	11	8	8	0	0	0	0	1	6
District of Columbia	0	0	1	2	5	5	0	0	0	3	0	2
Virginia	0	1	3	8	5	5	0	0	0	2	6	6
West Virginia	0	6	2	27	21	11	0	0	0	1	10	10
North Carolina	3	0	2	56	0	23	0	0	0	1	9	14
South Carolina	1	0	1	9	4	4	0	1	0	4	4	8
Georgia	1	1	2	12	12	12	0	0	0	8	6	18
Florida	0	2	3	1	5	2	0	0	0	0	4	4
EAST SOUTH CENTRAL												
Kentucky	10	3	3	14	30	29	0	0	0	8	15	20
Tennessee	2	4	4	23	19	10	0	0	0	7	18	15
Alabama	0	3	3	21	26	17	0	0	0	5	8	8
Mississippi [2]	2	3	2	6	19	8	0	0	0	11	5	9
WEST SOUTH CENTRAL												
Arkansas	1	5	2	3	1	4	0	1	0	7	5	19
Louisiana	1	0	0	0	5	5	0	0	0	4	7	13
Oklahoma	17	1	2	5	8	8	0	0	0	5	6	14
Texas	62	2	3	17	6	18	0	0	0	11	13	40
MOUNTAIN												
Montana	9	2	2	11	8	8	0	0	0	0	1	2
Idaho	0	0	1	2	2	3	0	2	0	1	1	1
Wyoming	5	0	0	6	1	1	0	0	0	0	0	1
Colorado	20	0	0	10	4	7	0	0	0	2	0	3
New Mexico	12	1	1	4	3	1	0	0	0	0	5	5
Arizona	1	2	2	2	0	0	0	0	0	3	4	2
Utah [2]	[5] 76	2	2	9	2	2	0	0	0	0	0	1
Nevada	0	0		2	0		0	0		0	0	
PACIFIC												
Washington	19	2	1	14	8	8	0	0	0	5	2	3
Oregon	16	0	2	7	0	6	0	0	1	1	1	1
California	114	12	12	58	25	39	0	0	0	1	2	7
Total	[5] 956	195	479	821	683	683	7	7	16	169	231	379
35 weeks	5,887	1,902	3,009	99,317	90,442	117,978	616	621	1,988	3,655	4,498	5,784

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 4, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended Sept. 4, 1943								
	Week ended		Median 1938-42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Sept. 4, 1943	Sept. 5, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	16	36	23	0	0	0	0	0	0	0	0	0
New Hampshire	0	1	0	0	0	0	0	0	0	0	0	0
Vermont	23	49	19	0	0	0	0	0	0	0	0	0
Massachusetts	37	134	110	0	0	3	0	0	0	0	0	0
Rhode Island	6	10	10	0	0	0	0	0	0	0	0	0
Connecticut	7	59	38	0	0	26	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	258	342	299	1	5	98	0	1	0	3	0	0
New Jersey	127	144	96	0	1	2	0	0	0	1	0	0
Pennsylvania	133	180	309	1	0	1	0	1	0	0	0	0
EAST NORTH CENTRAL												
Ohio	123	236	209	0	0	3	0	0	0	0	0	0
Indiana	27	28	19	0	0	0	0	0	0	2	0	0
Illinois	156	270	220	0	0	1	0	0	0	0	0	0
Michigan [2]	221	279	279	0	1	20	0	0	0	0	0	0
Wisconsin	208	250	250	0	0	0	0	1	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	50	69	35	0	0	1	0	0	0	0	1	0
Iowa	73	11	23	0	0	1	0	0	0	0	0	0
Missouri	13	7	8	0	0	0	0	1	0	0	0	0
North Dakota	42	11	18	0	0	0	0	0	0	0	0	0
South Dakota	12	0	3	0	0	0	2	0	0	[4] 0	0	0
Nebraska	9	10	3	0	0	0	0	0	0	0	0	0
Kansas	31	32	37	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	7	8	4	0	0	0	0	0	0	0	0	0
Maryland [2]	55	71	56	0	0	0	9	0	0	2	0	0
District of Columbia	24	10	15	0	0	0	0	0	0	0	0	0
Virginia	23	32	18	0	0	0	175	0	0	4	0	0
West Virginia	57	17	17	0	0	0	0	0	0	0	0	0
North Carolina	100	49	110	0	1	19	0	0	0	1	0	3
South Carolina	58	17	18	0	0	16	0	0	0	0	0	11
Georgia	13	36	17	0	0	3	3	0	0	1	1	36
Florida	19	11	7	0	5	0	0	0	0	0	0	9
EAST SOUTH CENTRAL												
Kentucky	23	52	29	0	0	1	0	0	0	0	0	0
Tennessee	27	27	25	0	0	0	6	0	0	1	3	0
Alabama	18	16	18	0	0	0	0	0	0	0	0	12
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	4
WEST SOUTH CENTRAL												
Arkansas	14	5	13	0	0	14	0	0	0	0	0	0
Louisiana	6	0	6	0	0	2	0	0	0	0	0	3
Oklahoma	2	4	4	0	0	0	0	0	0	0	0	0
Texas	139	132	132	0	16	213	0	2	1	0	0	50
MOUNTAIN												
Montana	17	17	17	0	0	0	0	0	0	0	1	0
Idaho	0	7	3	0	0	0	0	0	0	0	0	0
Wyoming	1	5	3	0	0	0	0	0	0	0	0	0
Colorado	32	20	20	0	0	7	0	3	3	0	0	0
New Mexico	9	6	8	0	0	5	0	0	0	0	0	0
Arizona	13	6	7	0	0	0	57	2	0	0	0	0
Utah [5]	60	8	36	0	0	0	0	1	0	0	0	0
Nevada	2	0	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	64	36	23	0	0	0	0	0	0	0	0	0
Oregon	46	20	14	0	0	0	0	0	0	1	0	0
California	135	129	147	0	1	11	0	12	0	0	0	0
Total	2,536	2,894	2,894	2	30	447	252	25	1	[4] 16	6	128
35 weeks	137,429	128,043	131,769	44	1,435	11,096	2,220	475	19	353	611	2,469
35 weeks, 1942	------	------	------	60	752	6,056	4,685	361	35	399	676	2,098

[1] New York City only. [2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: New Hampshire, 1; Massachusetts, 2; New York, 3; New Jersey, 3; Michigan, 3; Georgia, 1.
[4] Exclusive of delayed report of 1 case in South Dakota for the week ended July 24, 1943.
[5] Delayed reports in Utah included.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 21, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	0	3	2	0	1	0	0	10
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	8	1	8	1	20	0	0	27
Fall River	0	0	------	0	0	0	0	0	0	0	0	4
Springfield	0	0	------	0	1	0	0	0	6	0	0	0
Worcester	0	0	------	0	1	0	10	0	3	0	1	0
Rhode Island:												
Providence	0	0	------	0	9	1	1	6	2	0	0	13
Connecticut:												
Bridgeport	0	0	------	0	0	0	1	6	0	0	0	1
Hartford	0	0	------	0	0	0	0	1	1	0	0	0
New Haven	0	0	------	0	1	0	0	23	0	0	1	3
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	0	3	1	4	1	0	1	8
New York	5	1	2	0	90	12	26	27	21	0	5	87
Rochester	0	0	------	0	4	2	6	0	0	0	0	4
Syracuse	0	0	------	0	3	0	1	0	0	0	0	23
New Jersey:												
Camden	0	0	------	0	0	0	1	0	2	0	1	0
Newark	0	0	------	0	12	0	3	0	0	0	0	38
Trenton	0	0	------	0	0	0	1	0	0	0	0	3
Pennsylvania:												
Philadelphia	1	0	------	1	3	2	14	1	7	0	2	70
Pittsburgh	0	0	------	0	7	1	11	1	0	0	1	16
Reading	0	0	------	0	0	0	0	0	0	0	0	9
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	1	6	1	2	1	4	0	2	6
Cleveland	2	0	------	0	2	1	4	3	19	0	1	44
Columbus	0	0	------	0	5	0	2	1	2	0	0	8
Indiana:												
Fort Wayne	0	0	------	0	0	0	4	0	0	0	0	1
Indianapolis	1	0	------	0	1	0	3	0	2	0	0	17
South Bend	0	0	------	0	1	0	0	0	1	0	0	0
Terre Haute	0	0	------	0	0	0	2	0	0	0	1	0
Illinois:												
Chicago	3	0	------	0	16	7	6	91	10	0	0	91
Springfield	0	0	------	0	2	0	3	0	0	0	0	0
Michigan:												
Detroit	5	0	------	0	10	3	3	0	5	0	1	73
Flint	0	0	------	0	1	0	0	0	1	0	0	2
Grand Rapids	0	0	------	0	10	1	1	0	0	0	0	20
Wisconsin:												
Kenosha	0	0	------	0	2	0	0	0	0	0	0	4
Milwaukee	0	0	------	0	8	1	1	0	3	0	0	82
Racine	0	0	------	0	1	0	0	0	1	0	0	4
Superior	0	0	------	0	16	0	0	0	0	0	0	4
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	14	0	0	2	0	0	0	14
Minneapolis	0	1	------	0	0	0	0	3	6	0	0	8
St. Paul	1	0	------	0	3	0	3	5	1	0	0	31
Missouri:												
Kansas City	0	0	------	0	2	0	8	5	3	0	0	8
St. Joseph	0	0	------	0	0	0	0	1	0	0	1	0
St. Louis	0	1	1	0	5	1	1	0	3	0	3	24

City reports for week ended Aug. 21, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	1	0	------	0	1	0	0	1	0	0	0	3
Nebraska:												
Omaha	3	0	------	0	0	0	1	3	0	0	0	1
Kansas:												
Topeka	0	0	------	0	0	0	0	2	0	0	0	1
Wichita	0	0	------	0	0	0	7	7	2	0	0	8
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0	------	0	1	2	2	0	0	0	0	2
Maryland:												
Baltimore	1	0	1	1	14	6	6	0	2	0	0	60
Cumberland	0	0	------	0	0	0	0	0	0	0	0	1
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	8	2	9	0	4	0	1	17
Virginia:												
Lynchburg	0	0	------	0	27	0	3	0	0	0	0	11
Richmond	0	0	------	0	9	1	3	0	0	0	0	2
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Wheeling	0	0	------	0	0	0	1	0	0	0	1	4
North Carolina:												
Winston-Salem	3	0	------	0	0	0	0	0	2	0	0	11
South Carolina:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	0
Georgia:												
Atlanta	3	0	4	0	1	0	1	0	1	0	1	2
Brunswick	0	0	------	0	0	0	0	0	1	0	0	0
Savannah	0	0	------	0	0	0	1	0	0	0	0	0
Florida:												
Tampa	0	0	------	0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	0	0	7	0	0	0	1	14
Nashville	0	0	------	0	0	0	0	0	0	0	0	13
Alabama:												
Birmingham	0	0	------	0	1	0	6	0	0	0	0	0
Mobile	1	0	------	1	1	0	2	0	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	0	0	0	0
Louisiana:												
New Orleans	0	0	7	0	1	0	10	7	2	0	2	2
Shreveport	0	0	------	0	0	0	5	0	0	0	0	0
Texas:												
Dallas	0	0	------	0	1	0	3	18	0	0	3	8
Galveston	0	0	------	0	0	0	1	0	1	0	0	0
Houston	2	1	------	0	4	0	4	2	1	0	0	1
San Antonio	1	0	------	0	3	0	4	0	0	0	2	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	1	0	1	0	0	0	1	0
Great Falls	0	0	------	0	3	0	0	0	1	0	0	4
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	2	0	2	0	3	0	1	5	2	0	0	30
Pueblo	0	0	------	0	1	0	2	2	0	0	0	0
Utah:												
Salt Lake City	0	0	------	0	2	0	1	4	2	0	0	9

City reports for week ended Aug. 21, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	------	0	12	0	0	1	1	0	0	19
Spokane	0	0	------	0	1	0	0	0	4	0	0	6
Tacoma	0	0	------	0	1	0	0	0	0	0	0	0
California:												
Los Angeles	1	0	4	1	21	0	3	27	8	0	1	27
Sacramento	0	0	------	0	0	0	2	18	0	0	0	2
San Francisco	0	0	------	0	8	0	6	5	6	0	0	13
Total	37	4	21	5	367	51	224	284	166	0	34	1,029
Corresponding week, 1942	40	7	24	7	195	17	229	46	180	1	27	1,249
Average, 1938–42	52	------	28	[1] 7	[2] 215	------	[1] 221	------	188	2	52	1,274

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: Boston, 2; New York, 1; Philadelphia, 1; Detroit, 1.
Dysentery, bacillary.—Cases: Buffalo, 5; Philadelphia, 1; Cincinnati, 6; Cleveland, 1; St. Louis, 4; Baltimore, 6; Charleston, S. C., 7; Los Angeles, 7.
Dysentery, unspecified.—Cases: Cleveland, 4; Baltimore, 1; Richmond, 1; San Antonio, 4.
Rocky Mountain spotted fever.—Cases: Philadelphia, 1; St. Louis, 1; Nashville, 1.
Typhus fever.—Cases: Wichita, 1; Savannah, 5; Dallas, 6; Galveston, 2; Houston, 4; San Antonio, 4; Los Angeles, 1.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,614,400)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
NEW ENGLAND	0.0	0.0	0.0	0.0	49.7	12.4	57.1	91.9	82.0	0.0	5.0	144
MIDDLE ATLANTIC	2.7	0.4	0.9	0.4	53.1	8.9	28.5	14.7	13.8	0.0	4.5	115
EAST NORTH CENTRAL	6.4	0.0	0.0	0.6	47.3	8.2	18.1	50.1	28.0	0.0	2.9	208
WEST NORTH CENTRAL	9.8	3.9	2.0	0.0	48.9	2.0	39.1	56.7	29.3	0.0	7.8	192
SOUTH ATLANTIC	14.2	0.0	8.9	1.8	102.9	19.5	47.9	0.0	17.7	0.0	5.3	195
EAST SOUTH CENTRAL	5.9	0.0	0.0	5.9	11.9	0.0	89.1	0.0	5.9	0.0	5.9	160
WEST SOUTH CENTRAL	8.8	2.9	20.5	0.0	26.4	0.0	82.1	79.2	11.7	0.0	20.5	35
MOUNTAIN	16.1	0.0	16.1	0.0	80.4	0.0	40.2	88.4	40.2	0.0	8.0	346
PACIFIC	1.7	0.0	7.0	1.7	75.2	0.0	19.2	89.1	33.2	0.0	1.7	117
Total	5.6	0.6	3.2	0.8	55.3	7.7	33.7	42.8	25.0	0.0	5.1	155

PLAGUE INFECTION IN MONO COUNTY, CALIFORNIA

Plague infection has been reported proved in tissue from 9 chipmunks (*Eutamias* sp.) taken July 19, 1 mile east and 4 miles south of June Lake, Mono County, Calif.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 7, 1943.—During the week ended August 7, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox	1	10	1	23	61	11	15	17	26	165
Diphtheria		5		15		1		1		22
Dysentery (bacillary)				1		1				2
Encephalitis, infectious							1			1
German measles				1	15			6	6	28
Influenza					7				1	8
Measles		22	1	1	171	24	15	72	65	371
Meningitis, meningococcus					2	2	1	1		6
Mumps		8		14	86	12	6	26	14	166
Poliomyelitis		1		3	1					5
Scarlet fever	1	3	1	30	49	16	6	15	16	137
Smallpox							2			2
Tuberculosis (all forms)	3		22	124	38	3	14	12	31	247
Typhoid and paratyphoid fever			1	19						20
Undulant fever				8		1			2	11
Whooping cough				74	127	23	19	57	32	332

NEW ZEALAND

Vital statistics—Year 1942–43.—Following are the vital statistics for New Zealand for the year 1942–43 as published by the Director-General of Health:

	Number	Rate per 10,000 population
Live births	33,574	[1] 21.73
Stillbirths		[2] 26.54
Deaths		[1] 10.60
Deaths of infants		[2] 28.71
Maternal mortality		[2] 2.53
Deaths from:		
Appendicitis	68	.44
Bright's disease	493	3.19
Bronchitis	210	1.36
Bronchopneumonia	326	2.11
Cancer	2,020	13.07
Cerebral hemorrhage	1,530	9.90
Diabetes	352	2.28
Diarrhea and enteritis	78	.50
Diphtheria	24	.16
Diseases of the arteries	188	1.22
Deaths from:—Continued.		
Heart disease	5,625	36.41
Hernia and intestinal obstruction	114	.74
Influenza (including pneumonia)	248	1.61
Measles	31	.20
Pneumonia	235	1.52
Scarlet fever	1	.01
Senility	468	3.03
Tuberculosis (all forms)	607	3.93
Typhoid and paratyphoid fever	8	.05
Violence	891	5.77
Whooping cough	4	.03

[1] Per 1,000 population. [2] Per 1,000 live births.

SWITZERLAND

Notifiable diseases—January–March 1943.—During the months of January, February, and March 1943, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	January	February	March
Cerebrospinal meningitis	5	10	13
Chickenpox	215	144	256
Diphtheria and croup	235	218	256
Dysentery	2	7	25
German measles	10	11	19
Hepatitis, epidemic	219	182	187
Influenza	73	60	65
Leprosy			1
Measles	150	138	315
Mumps	152	212	334
Paratyphoid fever	14	3	5
Poliomyelitis	6	5	4
Scarlet fever	214	172	236
Trachoma		1	
Tuberculosis	268	327	441
Typhoid fever	16	7	6
Undulant fever	3	3	22
Whooping cough	76	94	138

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Cochinchina.—For the period July 21–31, 1943, 1 fatal case of plague was reported in Cochinchina, Indochina.

Smallpox

Algeria.—Smallpox has been reported in Algeria as follows: July 11–20, 1943, 39 cases; July 21–31, 1943, 30 cases.

Indochina.—Smallpox has been reported in Indochina as follows: July 11–20, 1943, 107 cases; July 21–31, 1943, 111 cases.

Turkey.—Smallpox has been reported in Turkey as follows: Week ended July 10, 1943, 150 cases; week ended July 17, 1943, 133 cases; for the period August 1–15, 1943, 283 cases.

Typhus Fever

Algeria.—Typhus fever has been reported in Algeria as follows: July 11–20, 1943, 94 cases; July 21–31, 1943, 115 cases.

Rumania.—For the 2 weeks ended August 21, 1943, 84 cases of typhus fever were reported in Rumania.

Slovakia.—During the week ended August 7, 1943, 22 cases of typhus fever were reported in Slovakia.

Spain.—Typhus fever has been reported in Spain as follows: For the 2 weeks ended July 3, 1943, 25 cases; week ended July 10, 1943, 11 cases.

Tunisia.—For the period July 11–20, 1943, 50 cases of typhus fever were reported in Tunisia, including 13 cases reported in Tunis.

Turkey.—Typhus fever has been reported in Turkey as follows: Week ended July 10, 1943, 113 cases; week ended July 17, 93 cases; August 1–15, 1943, 206 cases.

Yellow Fever

Brazil—Para State—Ponta de Pedras.—On July 8, 1943, 1 death from yellow fever was reported in Ponta de Pedras, Para State, Brazil.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

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SURVEYS OF LIQUID WASTES FROM MUNITIONS MANUFACTURE[1]

III. SMALL ARMS AMMUNITION

By RUSSELL S. SMITH, *Public Health Engineer*, and W. W. WALKER, *Associate Sanitary Chemist, United States Public Health Service, Stream Pollution Investigations, Cincinnati, Ohio*

Previous papers in this series have presented data on the industrial wastes from the manufacture of trinitrotoluene (TNT) and smokeless powder. While the surveys at the various explosives plants were under way, inquiries were received concerning the wastes that might be expected from plants making small arms ammunition. As a result, surveys were made of the industrial wastes at plants manufacturing small arms ammunition (.30 and .50 caliber cartridges). This paper presents the data obtained from the surveys of three such plants. At some of the plants surveyed the sanitary sewage was separated from the industrial waste, while at other plants the sanitary sewage and the industrial waste were so intermingled that it was impracticable to measure and sample them separately.

MANUFACTURING PROCESSES

The manufacture of small arms ammunition consists essentially of forming the brass case, making the projectile, filling the percussion cap, and assembling the component parts, including the powder for propelling the bullet. The major industrial wastes come from that portion of the plant where the cartridge cases and projectile jackets are formed by a series of extrusions, or draws, from purchased brass blanks. Between draws the cases and jackets are annealed, pickled in acid, washed with detergents of various types, and lubricated in preparation for the next draw. Lubricants are used on the dies in the drawing machines and on the cutting tools in certain machine

[1] I. Trinitrotoluene (TNT) wastes and II. Smokeless powder wastes appeared in the PUBLIC HEALTH REPORTS, Vol. 58, No. 37, pp. 1365-1379 (September 10, 1943).

operations. Some liquid wastes come from the lead shop where lead ingots are drawn into wire and then shaped into projectiles. Lubricants are used for cooling dies and cutters on these machines, but the amount of waste is comparatively small.

FLOW MEASUREMENTS AND SAMPLING

Surveys were made at three plants manufacturing small arms ammunition. For the purposes of this report these plants will be designated as plants "A," "B," and "C."

At plant "A" the industrial waste flows included the domestic sewage from the cafeterias, locker rooms, and toilets in the manufacturing buildings. Storm water was discharged through a system of storm water sewers and did not mix with the industrial waste. The sanitary sewer system (actually carrying sanitary sewage plus industrial waste) was so arranged that it was difficult to separate the flows from individual manufacturing buildings. Four sampling points were arranged. One of these was on a sewer that carried the flow from a single .30 caliber building. At this point samples were taken every 40 minutes and composited uniformly over 24 hours. Flows for the period were determined from the water meter that supplied all the water for the building. A second sampling point was on the sewer that carried only the wastes from the primer area. At this point samples were taken and the depth of flow in the sewer was measured every 40 minutes. The flows were computed by Chezy formula and the samples were composited over 24 hours in accordance with the computed flows. There was, however, but little variation in the measured flows. The third sampling point was on the sewer carrying the wastes from a .50 caliber building plus those from the primer area. The sanitary sewage left the building through a separate pipe and entered the main sewer about 200 feet below the sampling point. The volume of waste during a 24-hour period, therefore, was taken to be that registered by the meter supplying all the water to the building minus the sanitary flow (computed from the number of employees) plus the computed flow from the primer area. The quantity of waste products from the .50 caliber building during the 24 hours was obtained by the difference in quantities of waste products at this point and at the sampling point in the primer area. Samples at this point were taken every 40 minutes and composited uniformly over 24 hours. All of the "sanitary sewage" from the plant (sanitary sewage plus industrial waste) and the sewage from the administration area flowed by gravity to the wet well of a pumping station which discharged through a force main to a municipal sewer system. Samples were taken at the inlet to the wet well of the pumping station and composited uniformly over 24 hours. Flows were measured by a Parshall flume and integrating meter at the end

of the force main. This integrator was read every morning by the plant operating force.

At plant "B" the sanitary sewage was separated from the industrial waste, but the industrial wastes are discharged into the storm drains. The waste water from the water treatment plant is carried in the same main sewer that receives the industrial waste from the .50 caliber ammunition manufacturing. For this reason, it was necessary to measure and sample the wastes from the .50 caliber area in two small sewers coming from the manufacturing buildings. V-notch weirs were constructed in these sewers and flow measurements and samples were taken every 30 minutes. These samples were composited for each sewer in accordance with the measured flows and then the two composite samples combined in proportion to the average flows in the two sewers. Thus a single 24-hour sample was obtained from the .50 caliber area. The wastes from the .30 caliber area flowed through another sewer into an open ditch. An end contracted rectangular weir was built in this ditch and an automatic sampler of the paddle wheel type, similar to those used on previous surveys, was installed. This sampler took from 10 to 15 samples per minute, roughly in accordance with the rate of flow. The sampler was visited every 3 hours, a flow measurement made at the weir, and the accumulated sample removed. These 3-hour samples were combined into a 24-hour composite in accordance with the measured flows. Due to heavy storm run-off on the sixth sampling day, the readings and samples from the .30 caliber area for that day had to be disregarded in tabulating results.

At plant "C" the industrial wastes, the sanitary sewage, and the storm drainage were all separated. Industrial wastes from the entire plant were brought by a common sewer to an industrial waste treatment plant. A wooden flume led from a manhole at the end of the sewer to a balancing lagoon. A weir was built in this flume and samples were taken and flow measurements made at this point every 30 minutes. The samples were combined into 24-hour composites in the usual manner. A Kennison flow nozzle with a recorder, including a totalizing dial, was installed between the balancing pond and the first unit of the treatment plant, and this nozzle and recorder were used to determine the actual flow of waste. However, it was deemed inadvisable to use the nozzle for the sampling point since much of the oil and grease in the waste was retained on the surface of the pond.

The sanitary sewage at plant "C" was treated in a plant adjacent to the industrial waste treatment plant. The sewage treatment plant did not include a measuring device, but a weir was installed and samples and flow readings were taken on the same schedule as at the industrial waste plant. This was done in order to obtain an estimate of the proper correction necessary for the sanitary sewage included in the measured flows at plant "A."

Every effort was made to obtain representative samples, but at plants "B" and "C" serious difficulties were experienced with heavy masses of oils and greases floating on the surface of the wastes. At times these floating masses would catch behind the weirs and quickly form a thick mat extending for some distance back up the sewer. When such mats were found, the sampler tried to break them and establish a free flow again before taking the sample. In general, samples were taken in the clear stream between the grease masses in order not to include a disproportionate amount of the scum.

CHARACTER OF THE WASTES

In general, the wastes are composed of various wash waters together with waste lubricants from the drawing machines, overflows, and drainage from the acid pickling baths, and soaps, other detergents, and lubricants from the predraw cleanings. Prominent characteristics of this waste are the copper and zinc content from the acid pickling baths and the grease from cutting oils and soaps. At plant "A" the waste was generally alkaline and the grease occurred as a soapy curd, but at the other two plants the waste was acid and a large amount of heavy grease scum floated in masses on the surface of the sewage and tended to collect in the sewers, forming a heavy mat on the surface of the flowing waste. On occasion this grease has collected on the interior of sewers to such an extent as to affect their capacity seriously within a few months.

The waste is turbid and greenish-grey in color with an oily or soapy odor that at times, when grease scum had stranded and been exposed to the air, resembled the odor of rancid fats.

ANALYTICAL DETERMINATIONS

All analytical work, except the determination of zinc, was done in the trailer laboratory of the United States Public Health Service located within the grounds of the plant. The trailer laboratory was not equipped to determine the zinc, so composite samples representing the waste flow over the entire sampling period at each plant were prepared and sent to the Stream Pollution Investigations Station of the Public Health Service at Cincinnati, Ohio. The following laboratory determinations were made on the wastes in the field laboratory: pH; acidity, both methyl red and phenolphthalein, or alkalinity; odor concentration; copper; grease; 5-day biochemical oxygen demand (B. O. D.); oxygen consumed; sulfates; total solids, volatile and ash; and suspended solids, volatile and ash.

Where possible, all determinations were made in accordance with "Standard Methods for the Examination of Water and Sewage, Eighth Edition." Oxygen consumed was determined by digestion with potassium dichromate instead of the more customary permanganate. Sulfates were determined gravimetrically by precipitating with barium chloride. B. O. D. determinations were made on samples neutralized and then seeded with river water. Copper was determined by the colorimetric carbamate method. Grease was determined gravimetrically after a triple wet extraction with hexane.

Several unsuccessful attempts were made to determine the zinc in the 7-day composite samples from plants "A" and "B" by the method prescribed in "Standard Methods." Finally copper, zinc, chromium, and lead were determined in the composite sample from plant "C" by a method that had been found applicable by the Kansas City Testing Laboratory of Kansas City, Mo. In this method, lead was precipitated from a slightly acidic solution as a sulfate by the addition of an equal volume of alcohol. Copper was precipitated from the lead sulfate filtrate with hydrogen sulfide, the resulting copper sulfide ashed, treated with ammonia, glacial acetic acid, and potassium iodide, and then titrated with sodium thiosulfate. The filtrate from the copper precipitation was slightly alkalinized, the chromium precipitated and filtered out. The chromium was redissolved in hot dilute sulfuric acid, oxidized with potassium permanganate, an excess of ferrous ammonium sulfate added, and then back-titrated with standard permanganate. After removal of the copper, the zinc was precipitated with hydrogen sulfide from a buffered acid solution as zinc sulfide, washed, ignited, and weighed as zinc oxide.

RESULTS AND DISCUSSION

Tables 1, 2, and 3 give the analytical results for the industrial waste flows from different parts of plant "A." Due to the intermingling of domestic sewage and industrial waste as explained in the section on flow measurements and sampling, it was necessary to correct the analytical results as determined in the laboratory to allow for the domestic sewage. This correction was made on the basis of flow and pounds of waste products per capita as determined at plant "C." The results for the .50 caliber area were corrected for the amounts of waste products found to be coming from the priming area. Examination of these tables shows that the strongest waste comes from the .50 caliber area. Although there is no great difference in 5-day B. O. D., oxygen consumed, or volatile solids, this waste contains twice as much grease and nearly 50 percent more copper than does the waste from the .30 caliber area.

TABLE 1.—*Analytical results, plant "A," .30 caliber area*

Sample date	pH	p. p. m.											
		Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total solids			Suspended solids			Sulfate
							Total	Volatile	Ash	Total	Volatile	Ash	
1	9.6	300	240	27	231	146	1,033	453	580	378	287	91	126
2	7.5	229	105	30	125	103	985	360	625	231	183	48	211
3	7.4	193	197	33	171	105	862	324	538	244	198	46	185
4	9.6	330	292	32	273	133	1,628	853	775	424	333	91	165
5	8.0	254	240	30	191	83	1,110	422	688	365	263	102	184
6	9.6	479	300	78	273	97	1,692	867	825	670	529	141	169
7	7.3	183	186	31	154	70	1,270	585	685	647	520	127	187
Average	8.4	231	223	37	203	105	1,226	552	674	422	330	92	175

TABLE 2.—*Analytical results, plant "A", .50 caliber area*

Sample date	pH	p. p. m.											
		Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total solids			Suspended solids			Sulfate
							Total	Volatile	Ash	Total	Volatile	Ash	
1	7.2	194	408	31	273	110	1,400	435	965	541	403	138	437
2	7.4	238	322	48	262	99	1,354	324	1,030	369	282	87	447
3	7.5	258	590	48	398	139	1,669	604	1,065	817	675	142	454
4	6.9	175	242	35	160	67	1,564	400	1,164	402	345	57	495
5	6.8	157	1,020	67	290	127	1,617	585	1,032	678	124	554	535
6	6.9	171	436	71	271	91	1,760	570	1,190	860	615	245	538
7	7.1	409	478	65	309	155	1,980	912	1,068	853	660	193	396
Average	7.1	229	499	52	280	113	1,620	547	1,073	645	443	202	472

TABLE 3.—*Analytical results, plant "A", entire plant*

Sample date	pH	p. p. m.											
		Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total solids			Suspended solids			Sulfate
							Total	Volatile	Ash	Total	Volatile	Ash	
1	7.7	232	184	19	105	89	1,270	448	822	268	205	63	204
2	6.8	188	151	47	95	77	1,288	232	1,056	250	184	66	330
3	8.5	236	210	28	155	51	1,825	515	1,310	262	205	57	224
4	7.9	218	258	13	193	69	1,460	560	900	287	214	73	232
5	7.4	194	186	14	176	69	1,690	383	1,307	326	234	92	244
6	7.6	211	161	76	116	53	1,754	476	1,278	217	149	68	270
7	7.4	214	140	17	145	59	1,755	501	1,254	326	246	80	202
Average	7.6	213	184	31	141	67	1,577	445	1,132	276	205	71	244

Tables 4, 5, and 6 give similar results for plant "B." As the domestic sewage at this plant was separated from the industrial waste, the results given in tables 4 and 5 were determined directly on the composited samples. The results shown in table 6 had to be computed from the measured flows and the total waste products discharged from the two separate areas. Again it is noticeable that the waste from the .50 caliber area is much stronger than that from the .30 caliber area. At this plant the waste, instead of being consistently alkaline, was acid to methyl red about half of the time. Examination of the results from the individual areas shows that the flow from the .30 caliber area was consistently acid, but that from the .50 caliber area was usually alkaline to methyl orange.

TABLE 4.—*Analytical results, plant "B," .30 caliber area*

Sample date[1]	pH	p. p. m.														Odor	
		Acidity							Total solids			Suspended solids					
		Methyl red	Phenol-phthalein	Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total	Volatile	Ash	Total	Volatile	Ash	Sulfate	Concentration	Type
1	3.2	64	163	----	144	31	99	47	1,143	520	623	236	236	0	416	4	Oily.
2	3.7	12	55	----	172	28	132	92	735	260	475	200	186	14	259	8	Do.
3	3.5	22	59	----	92	12	93	55	443	93	350	130	120	10	189	16	Do.
4	3.0	47	128	----	164	30	46	46	820	198	622	116	102	14	368	32	Do.
5	3.6	26	98	----	234	28	64	47	790	202	588	144	144	0	329	16	Do.
7	3.4	33	103	----	322	29	75	97	954	251	703	290	224	66	371	4	Do.
8	3.0	57	126	----	187	23	68	66	924	314	610	160	160	0	402	2	Do.
9	2.9	120	227	----	238	28	----	74	1.058	348	710	170	140	30	493	4	Do.
8-day composite	3.3	43	121	----	115	24	[2] 85	68	866	276	590	128	128	0	362	[2] 11	Do.

[1] Sampling day No. 6 omitted because of storm flow.
[2] Computed weighted mean.

TABLE 5.—*Analytical results, plant "B," .50 caliber area*

Sample date	pH	p. p. m.														Odor	
		Acidity							Total solids			Suspended solids					
		Methyl red	Phenol-phthalein	Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total	Volatile	Ash	Total	Volatile	Ash	Sulfate	Concentration	Type
1	3.7	22	82	----	636	18	237	103	1,357	839	518	1068	1032	36	286	16	Oily.
2	6.8	----	----	52	424	16	301	129	1,018	558	460	360	340	20	167	64	Soapy.
3	6.8	----	----	53	373	18	234	136	1,174	474	700	260	236	24	293	64	Do.
4	3.0	56	126	----	830	18	103	73	1,173	545	628	306	284	22	372	64	Oily.
5	3.4	34	109	----	646	35	103	98	1,145	635	510	500	500	0	282	128	Do.
6	5.8	----	----	30	377	37	125	134	1,390	694	696	610	466	144	250	32	Soapy.
7	7.2	----	----	65	637	11	148	176	1,547	912	635	756	676	80	248	16	Do.
8	6.2	----	----	27	756	20	137	185	1,315	700	615	850	850	0	302	32	Do.
9	>9.6	----	----	113	530	9	----	156	1,405	841	564	504	384	120	183	64	Oily.
9-day composite	6.4	----	----	21	428	28	[1]177	130	1,214	649	565	652	636	16	261	[1] 53	Soapy.

[1] Computed weighted mean.

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TABLE 6.—*Analytical results, plant "B," combined .30 and .50 caliber areas*

Sample date	p. p. m.												
	Acidity (methyl red)	Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total solids			Suspended solids			Sulfate
							Total	Volatile	Ash	Total	Volatile	Ash	
1	40	------	422	24	177	79	1,267	699	568	707	687	20	342
2	------	20	298	22	217	111	878	410	468	280	263	17	212
3	------	35	282	13	189	110	935	350	585	235	215	20	260
4	52	------	508	24	75	60	1,000	377	623	214	196	18	369
5	30	------	462	32	86	75	985	440	545	410	341	69	302
7	------	22	497	19	116	141	1,287	622	665	552	478	74	302
8	13	------	488	21	105	129	1,130	518	612	525	525	0	349
9	------	8	398	18	136	119	1,250	620	630	341	274	67	323
Average	6	------	419	22	138	103	1,092	505	587	408	372	36	307

Table 7 shows the analytical results on the combined industrial waste from all areas in plant "C." This waste was consistently strongly acid and much stronger than the waste at the other plants. The grease and copper contents were much higher than found elsewhere. As was noted under analytical methods, a mineral analysis for lead, copper, chromium, and zinc was made on the 7-day composite of the waste from this plant. This analysis showed: Copper, 72.7 p. p. m.; chromium, 0.4 p. p. m.; zinc, 56.6 p. p. m.; and lead 0 p. p. m. Similar analyses were not made on the composite wastes from plants "A" and "B," but, as the same composition brass is used, it is probable that the copper-zinc ratio would be approximately the same.

TABLE 7.—*Analytical results, plant "C," entire plant*

Sample date	pH	p. p. m.														Odor	
		Acidity		Alkalinity	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total solids			Suspended solids			Sulfate	Concentration	Type
		Methyl red	Phenolphthalein						Total	Volatile	Ash	Total	Volatile	Ash			
1	4.2	22	173	----	574	60	208	127	1,510	485	1,025	290	260	30	596	128	Oily.
2	3.2	67	239	----	428	74	212	125	1,500	405	1,095	260	230	30	648	128	Do.
3	3.0	105	293	----	250	66	297	134	1,377	297	1,080	140	138	2	675	64	Do.
4	3.2	76	231	----	520	66	291	126	1,554	479	1,075	334	294	40	648	128	Do.
5	3.9	22	193	----	964	76	559	270	2,490	1,347	1,143	868	810	58	618	128	Do.
6	3.7	21	214	----	543	150	313	270	2,396	1,282	1,114	852	788	64	625	512	Do.
7	3.0	105	331	----	281	110	206	98	1,516	406	1,110	154	136	18	717	128	Do.
Weighted mean	3.5	80	239	----	502	86	295	163	1,753	675	1,078	408	374	34	.647	170	Do.

Table 8 compares the analytical results on the total industrial waste flows for the three plants. It is to be expected that the strength of the wastes would vary as there was a large variation in the proportion of .30 and .50 caliber cartridges turned out by the different plants.

However, considering that the raw material (brass) was the same at the three plants and that it was put through the same processes by practically identical machines, it is difficult to explain the extreme variation in the hydrogen-ion concentration of the wastes unless it is ascribed to different detergents used by the various plants which were operated by different management contractors.

TABLE 8.—*Average analytical results, combined areas waste flows*

Plant	p. p. m.												
	Acidity (methyl red)	Alkalinity (methyl orange)	Grease	Copper	5-day B. O. D.	Oxygen consumed	Total solids			Suspended solids			Sulfate
							Total	Volatile	Ash	Total	Volatile	Ash	
"A"	------	213	184	31	141	67	1,577	445	1,132	276	205	71	244
"B"	6	------	419	22	138	103	1,092	505	587	408	372	36	307
"C"	60	------	502	86	295	163	1,753	675	1,078	408	374	34	647
Average	------	------	368	46	191	111	1,474	542	932	364	317	47	399

Table 9 summarizes the waste products found in the industrial wastes per 100,000 rounds of .30 caliber and .50 caliber ammunition and per 100,000 rounds of mixed small arms ammunition. This table again emphasizes the increased amounts of waste products per unit of production with the larger ammunition.

TABLE 9.—*Waste products per 100,000 rounds*

Plant	Million gallons flow	Pounds										
		Alkalinity	Mineral acid	SO_4	Grease	Copper	B. O. D.	Oxygen consumed	Total solids		Suspended solids	
									Volatile	Ash	Volatile	Ash
	.50 CALIBER AMMUNITION											
"A"	.0623	131	------	265	284	29.7	159	64	31.4	504	252	116
"B"	.0975	20	------	212	475	16.3	144	137	567	474	442	39.7
Average	.0799	76	------	239	380	23.0	152	67	299	489	347	78
	.30 CALIBER AMMUNITION											
"A"	.0252	58	------	37	46	7.9	42	22	114	141	69	19
"B"	.0242	------	9.40	73	40	5.4	17	14	58	120	34	3
Average	.0247	------	------	55	43	6.7	30	18	86	131	52	11
	COMBINED OUTPUT											
"A"	.0417	74	------	84	64	10.5	49	23	155	392	71	24.7
"B"	.0408	------	8.0	104	144	7.5	47	40	174	198	129	12.2
"C"	.0258	------	12.9	140	109	18.6	64	35	146	232	81	7.4
Average	.0361	------	------	76	106	12.2	53	33	158	274	94	14.8

TREATMENT OF WASTES

At plant "C" a waste treatment plant was in operation to treat the industrial waste before it was discharged to the receiving stream. During the course of the waste survey at this plant, samples were taken of the plant effluent and at a couple of intermediate points on the same time schedule as the samples of industrial waste in order to determine the efficiency of the waste treatment.

The plant consisted of a balancing, or equalizing, lagoon, a grease aeration-flotation unit, a tank for flocculation of the waste with lime and alum, and final settling ponds. A Kennison nozzle with recorder measured the waste flow between the equalizing lagoon and the grease removal tank.

The balancing lagoon was a large pit, square in plan with 3:1 side-slopes covered with crushed stone, and had a detention period of 13.4 hours with the average flow measured during the survey period. The waste was admitted to the pond through an E-shaped series of bottom-perforated troughs covering about half of the surface and was taken off by a double weir launder near the opposite bank. Because of the large amount of oil and grease scum that collected on the surface of the lagoon, a grease trap was built into the sewer just ahead of the pond to intercept the grease and flush it directly to the grease removal tank.

The grease-removal tank was rectangular in plan with the flow entering at one end and passing out over a baffled weir at the other. A full depth transverse baffle about seven-tenths of the distance from the inlet to the outlet divided the tank into aeration and flotation sections. The aeration section contained two American Well Works down-draft aerators and had a detention period of 2.1 hours. The quiescent flotation section had a detention period of 0.74 hour and an overflow rate of 2,120 gallons per square foot of surface area per 24 hours. It had been expected that most of the grease would rise to the surface on this flotation section, but a large proportion of it remained in the aeration portion of the unit. The grease was skimmed by hand at frequent intervals into two longitudinal troughs along the outside of the tank and then scraped into a large earth storage pit. Arrangements were made to add sulfuric acid to the waste ahead of the grease removal unit to aid in separation of the grease, but this was not necessary during the period of the survey.

After grease removal, lime sludge from the water-softening plant and dry hydrated lime were added to the waste to make it slightly alkaline and alum was added, if necessary, for additional flocculation. After addition of the chemicals, the waste passed to a rectangular flocculator with a detention period of 2.39 hours. This flocculation

tank contained three American Well Works turbine pump agitators for stirring.

From the flocculator the waste passed to the final settling lagoons before being discharged. These lagoons were excavated pits, rectangular in plan, with 3:1 side slopes. The waste entered at one end through a bottom-perforated trough extending the width of the tank and was removed by means of a double weir trough at the other end. No means were provided for sludge removal. It had been planned to use one lagoon only until it was filled with sludge, an estimated period of 2 years, and then to put the other lagoon into service, but at the time of the survey both units were being used in parallel. The combined detention period was 73.6 hours, disregarding sludge deposits.

The treatment plant produced an effluent that would probably not be detrimental to any stream into which it might be discharged. The final effluent was clear, colorless, practically neutral, without any noticeable odor, and reasonably low in copper, grease, and B. O. D. Table 10 shows the average analytical results of the samples taken at various points in the plant.

TABLE 10.—*Average analytical results, waste treatment plant*

Sampling point		p. p. m.												Odor	
		Acidity					Total solids			Suspended solids					
	pH	Methyl red	Phenolphthalein	Alkalinity	Grease	Copper	Total	Volatile	Ash	Total	Volatile	Ash	5-day B. O. D.	Concentration	Type
1. Raw waste	3.5	60	239	----	709	86	1,763	684	1,079	413	379	34	298	174	Oily.
2. After grease removal	3.6	55	211	----	54	82	------	----	------	----	----	----	----	55	Do.
3. Influent final settling	6.9	----	----	333	----	64	------	----	------	867	358	509	----	48	Soapy.
4. Final effluent	6.9	----	----	43	8	9	1,510	302	1,208	25	13	12	47	14	Do.

The plant accomplished a reduction of 84 percent in biochemical oxygen demand and 94 percent in suspended solids, although the reduction in volatile suspended solids (those that might decompose in the receiving stream) was 96½ percent. The greater portion of the grease was removed in the aeration and flotation unit where 92½ percent of the hexane soluble material was removed. This grease, as removed, had a specific gravity of 0.8363 and a moisture content of 35.07 percent. It had an ash content of 6.54 percent, copper 0.52 percent, and hexane soluble material 58.36 percent, based on the average of two check determinations of a sample of the grease removed over a 3-day period. Of the grease passing the flotation unit, 85 percent was removed by the flocculation and settling, giving an over-all removal of 99 percent. Practically all of the copper was removed by the flocculation and settling, although the analysis of the

grease showed that some remained in this material. The total removal of copper averaged 89½ percent.

As has been noted, the flow at plant "A" was consistently alkaline for 24-hour composites. To have treated this flow by the same method used at plant "C" would have required large amounts of acid. It is of interest to note, however, that the copper apparently was contained in the soapy curd. On several samples copper determinations were made before and after filtering the waste through filter paper. This filtration of the waste showed a reduction of 89 to 97 percent in the copper. It is possible that a combination of settling and mechanical filtration could remove enough of the grease and copper from a waste like that at plant "A" so that the effluent could be treated biologically in a manner similar to any normal municipal sewage.

SUMMARY

Results of industrial waste surveys at three large plants manufacturing small arms ammunition (.30 and .50 caliber military cartridges) are presented. Although the plants were very similar and of approximately the same size, there were marked differences in the waste flows. This was due in part to differences in the proportion of .30 and .50 caliber cartridges being manufactured at the different plants and in part to other unknown causes. There is a greater waste flow and larger actual amounts of waste products per 100,000 rounds of finished ammunition from the manufacture of .50 caliber cartridges than from the manufacture of .30 caliber. Average results, however, would indicate that per 100,000 rounds of mixed ammunition there could be expected a flow of 36,000 gallons containing about 100 pounds of grease, 12 pounds of copper, and 95 pounds of volatile suspended solids, and a 5-day B. O. D. population equivalent of 300 people.

A description is given of a plant treating this waste by means of grease flotation and chemical precipitation. Operating results of this treatment are tabulated.

IV. TETRYL WASTES

By Russell S. Smith, *Public Health Engineer, United States Public Health Service, Stream Pollution Investigations, Cincinnati, Ohio*

This report, the fourth of a series of five on the liquid wastes resulting from munitions manufacturing, presents the data gathered from surveys of two plants manufacturing tetryl. This explosive, which is less resistant to shock than trinitrotoluene (TNT), is used as a booster charge to detonate the main explosive charge in shells and bombs.

MANUFACTURING PROCESSES

Tetryl, or 2, 4, 6-trinitrophenylmethylnitramine, is made by the nitration of dimethylaniline, boiling the product in water to remove some of the impurities, then dissolving it in acetone and filtering to remove certain insoluble impurities, and finally recrystallizing.

The dimethylaniline is dissolved in concentrated sulfuric acid and this solution is run into the nitrating acid (a mixture of nitric and sulfuric acids) in the nitrator. After the nitration is completed the mixture is allowed to cool and the crude tetryl crystallizes out. This crude tetryl is separated from the spent nitrating acid on open vacuum filters and is washed with hot water to remove the last traces of the nitrating acid and certain water soluble impurities. It is then dissolved in acetone, the solution run into recrystallizing vats, and the tetryl is recrystallized under controlled conditions so as to form small free-flowing crystals. These crystals, after drying, are packed and sent to storage magazines awaiting shipment.

SAMPLING AND FLOW MEASUREMENTS

In making the surveys of waste flows from tetryl manufacturing no account was taken of the flows from power house and acid manufacturing areas. In general, a plant manufactures more than one type of explosive. The power house and acid areas serve the entire plant and it is practically impossible to ascribe the proper proportion of the flow from these areas to the manufacturing of a particular explosive. These flows are essentially cooling water, possibly slightly contaminated with acid, and may be discharged without damage to a stream.

In plant "A" waste discharge pumps were so adjusted that the main sewer from the tetryl area flowed full at all times. Direct measurements of the waste discharge were, therefore, impracticable and waste flows were based on water furnished the area. This water was from three sources, two of which were equipped with meters. Water from the other source had to be estimated from data supplied by the plant operating forces.

Sampling of the waste was done over a 24-hour period every other day for 2 weeks, thus obtaining the equivalent of a full week of operation. During the sampling periods, dip samples were taken from a manhole on the main waste sewer from the area every 20 minutes and composited uniformly into 12-hour samples. All analytical determinations were made on these composite samples.

In plant "B", a contracted weir with a 3-foot crest was placed in the ditch carrying the waste water from the tetryl area. The head on the weir was read every 3 hours to determine the flow from the area. A paddle wheel sampler was installed in the ditch which put about 15 samples per minute into a pail. These samples were collected every

3 hours and composited according to the measured flow into a 24-hour sample. All analytical determinations were made on these 24-hour samples. Flow measurements were made and samples taken over a 24-hour period every other day for 16 days, thus obtaining a representative week's operation of the plant.

ANALYTICAL DETERMINATIONS

The following laboratory determinations were made on the composite samples of the waste: pH; color; odor concentration; acidity, both methyl red and phenolphthalein; 5-day biochemical oxygen demand (B. O. D.); oxygen consumed; sulfates; nitrite nitrogen; nitrate nitrogen; soap hardness; total solids, volatile and ash; and suspended solids, volatile and ash.

In general, all determinations were made in accordance with the procedures of "Standard Methods of Analysis for Water and Sewage, Eighth Edition." The pH of the waste was determined colorimetrically with an occasional potentiometric check using the glass electrode. Color was determined by the use of a standard color comparator using glass standards based on the cobalt color scale. Oxygen consumed was determined by digestion with potassium dichromate in accordance with the customary practice of the Stream Pollution Investigations Station laboratory of the United States Public Health Service.

The 5-day biochemical oxygen demand results were very erratic During preliminary work with a large number of catch samples, concentrations of 5, 10, 25, 50, and 100 percent of the waste were set up after neutralizing and seeding. The 5-percent and 10-percent concentrations gave such small oxygen depletions in 5 days that slight inaccuracies in reading a burette would introduce large proportionate errors. The concentrations of 50 percent and 100 percent showed smaller depletions than those of 25 percent; hence it was concluded that the waste was toxic to the seeding organisms in the larger concentrations. The results in concentrations of 5 percent and 10 percent did not check with those in concentrations of 25 percent. Consideration of these facts led to the adoption of the 25-percent concentration for all B. O. D. determinations on this waste. The results are reported, but, because of evident inconsistencies, reliance should not be given to them as a measure of the strength of the waste.

When making the oxygen consumed determination, interference was found in some cases and erratic results ensued. Apparently at intervals there was some substance in the waste which made it impossible to reach a final end point when backtitrating the excess dichromate. The nature and source of this interfering substance are not known. It was found difficult to obtain check results with duplicate samples and the digestion time was lengthened to 4 to 5 hours but longer digestion periods apparently tended to result in decomposition of the

reagent. The oxygen consumed results appear to be more reliable than the B. O. D. results, although inconsistencies are to be noted.

RESULTS AND DISCUSSIONS

Tables 1 and 2 give the analytical results for the various composite samples at the two plants. In table 1, the "day" sample on the sixth day shows plainly that something unusual occurred in the plant operating routine. Acidity, sulfates, nitrogen, and solids in the waste doubled or trebled. Evidently either some acid was lost by a spill or overflow into the sewer, or, more probably, a charge was "drowned" or dumped because of a dangerously rapid rise in temperature during nitration. The results for this period are so far out of line with the other data that they have not been included in the average, but it is important to note that such accidents may take place at any time with their attendant effects upon the receiving stream. The results show that this type of waste is normally very uniform in character, strongly acid and clear, but that over half of the solids present, both suspended and total, are of a volatile nature. Although these records do not indicate it, the waste has a slight yellow-green color and an oily odor.

TABLE 1.—*Analytical results, plant "A"*

Sample date	Sampling period	pH	Color	Odor concentration	p. p. m.												
					Acidity		5-day B. O. D.	Oxygen consumed	SO_4	Soap hardness	Nitrogen		Total solids		Suspended solids		
					Methyl red	Phenol-phthalein					NO_2	NO_3	Volatile	Ash	Volatile	Ash
1	Day	1.9	105	4	564	595	12.5	9.1	668	594	2.1	150	250	530	8	24
	Night	1.9	100	4	680	695	11.1	9.6	790	552	4.5	70	430	450	9	4
2	Day	1.9	95	4	612	632	22.1	6.8	708	538	2.6	140	326	478	9	9
	Night	1.8	100	2	701	714	21.8	9.8	837	512	3.0	90	827	439	18	2
3	Day	1.9	105	4	604	744	5.1	13.0	824	456	2.1	160	460	425	11	7
	Night	1.9	105	4	634	652	19.8	9.7	734	422	3.1	130	800	420	12	5
4	Day	2.0	95	4	481	503	1.0	9.4	644	478	3.0	110	310	440	4	6
	Night	2.0	95	4	502	518	4.2	12.1	643	397	3.8	100	455	445	8	15
5	Day	1.8	85	8	753	794	3.5	11.9	825	504	4.5	85	387	423	11	0
	Night	1.8	80	8	702	723	1.8	10.5	683	418	6.0	110	727	423	12	3
6	Day	1.6	125	8	2,020	2,060	4.9	16.3	1,764	392	25.0	400	1,815	465	23	14
	Night	1.8	110	4	608	624	17.8	(1)	703	281	5.5	110	290	440	8	7
7	Day	2.0	100	16	659	688	6.9	11.3	760	285	2.8	100	766	424	12	4
	Night	1.9	105	16	761	791	7.1	10.0	820	314	5.0	120	434	436	13	2
Average		1.9	100	6	734	759	10.0	10.7	812	438	5.2	133	591	445	11	8
Average, excluding "6-day."		1.9	98	6	635	659	10.4	10.3	740	442	3.7	113	497	443	10	7
Maximum		2.0	125	16	2,020	2,060	22.1	16.3	1,764	594	25.0	400	1,815	530	23	24
Minimum		1.6	80	2	481	503	1.0	6.8	643	281	2.1	70	250	420	4	0

[1] Interference.

TABLE 2.—*Analytical results, plant "B"*

Sample day	pH	Color	Odor concentration	p. p. m. Acidity Methyl red	Acidity Phenol-phthalein	5-day B. O. D.	Oxygen consumed	SO_4	Soap hardness	Nitrogen NO_2	Nitrogen NO_3	Total solids Volatile	Total solids Ash	Suspended solids Volatile	Suspended solids Ash
1	2.2	85	2	224	316	6.9	15.8	264	163	1.6	35	174	291	7	18
2	2.3	85	2	182	228	7.2	12.5	237	150	1.0	8	304	286	15	57
3	2.5	90	2	232	273	5.4	11.7	262	146	1.6	40	280	285	9	31
4	2.4	100	2	256	294	10.3	21.0	278	136	1.0	30	330	245	5	20
5	2.3	160	2	407	444	23.8	29.1	415	148	1.6	40	577	313	13	51
6	2.3	220	1	423	471	10.5	15.1	448	161	1.6	80	602	331	10	27
7	2.0	120	2	632	697	9.2	18.6	630	167	1.8	80	859	354	5	26
8	2.4	150	1	428	467	11.1	17.0	443	134	1.2	80	546	278	10	23
Average	2.3	126	2	348	399	10.6	17.6	372	151	1.4	49	459	298	9	32
Maximum	2.5	220	2	632	697	23.8	29.1	630	167	1.8	80	859	354	15	57
Minimum	2.0	85	1	182	228	5.4	11.7	237	134	1.0	8	174	245	5	18

Table 3 indicates the average characteristics of the waste that might be expected from this type of explosive manufacture. Table 4 shows the quantities of waste products to be expected per 10,000 pounds of explosive produced. The population equivalent based on the bio-chemical oxygen demand is given, although this figure is naturally subject to the inaccuracies discussed under the B. O. D. determination and too great reliance should not be placed on it.

TABLE 3.—*Average of analytical results*

Plant	pH	Color	Odor concentration	p. p. m. Acidity Methyl red	Acidity Phenol-phthalein	5-day B. O. D.	Oxygen consumed	SO_4	Soap hardness	Nitrogen NO_2	Nitrogen NO_3	Total solids Volatile	Total solids Ash	Suspended solids Volatile	Suspended solids Ash
"A"	1.9	98	6	635	659	10.4	10.3	740	442	3.7	113	497	443	10	7
"B"	2.0	126	2	348	399	10.6	17.6	372	151	1.4	49	459	298	9	32
Average	2.0	112	4	492	529	10.5	15.0	556	297	2.6	81	478	371	10	20

Except for the acidity, the waste apparently would not cause any serious trouble in the receiving stream. However, in common with the wastes from all types of explosive plants, it is high in nitrates and these might help to promote an increase in algae growths in the receiving stream. These growths could be the cause of tastes and odors in a water supply and might cause difficulty in a water treatment plant by shortening filter runs. If discharged into a good sized river and adequately mixed, the waste apparently should not require treatment before discharge.

TABLE 4.—*Waste quantities*

	Waste per 10,000 pounds of explosives produced		
	Plant "A"	Plant "B"	Average
Flow .... million gallons..	0.91	0.68	0.80
Free mineral acid as H_2SO_4 .... pounds..	4,830	1,970	3,400
Sulfates .... do..	5,630	2,100	3,865
Nitrite nitrogen .... do..	28	8	18
Nitrate nitrogen .... do..	867	278	572
Total solids:	7,150	4,275	5,713
Volatile .... do..	3,780	2,590	3,185
Ash .... do..	3,370	1,685	2,528
Suspended solids:	129	232	180
Volatile .... do..	76	51	63
Ash .... do..	53	181	117
Oxygen consumed .... do..	78	100	89
5-day B. O. D .... do..	79	60	68
Population equivalent (B. O. D.)	465	354	409

Tests for toxicity of the waste were made at the National Institute of Health of the United States Public Health Service by Dr. L. T. Fairhall, principal industrial toxicologist. A composite sample of the waste was neutralized to a pH of 7, made isotonic with sodium chloride, and sterilized in an autoclave for an hour. Two mice were each given a ½-ml. interperitoneal injection of the sterilized waste, one guinea pig was given 2 ml. of sterilized waste interperitoneally, and one rabbit was given an intravenous injection of 15 ml. All results were negative and the animals showed no ill effects from the different injections. It was concluded, therefore, that the waste apparently was not toxic.

V. NITROGLYCERINE WASTES

By RUSSELL S. SMITH, *Public Health Engineer, United States Public Health Service, Stream Pollution Investigations, Cincinnati, Ohio*

This is the fifth and last of a series of five reports on the liquid wastes resulting from the manufacture of munitions of various types. Nitroglycerine is not used to a great extent in munitions work and the wastes from its manufacture are but a minor problem when considering munitions wastes as a whole. However, some of this product is being manufactured for incorporation into military explosives of certain types and it was considered advisable to obtain data on the wastes when the opportunity occurred. The data presented in this report are based on a survey of a single plant of moderate size.

DESCRIPTION OF PROCESS

The manufacture of nitroglycerine consists simply of nitrating commercial glycerine with a mixture of nitric and sulfuric acids. As in other nitrating processes, the sulfuric acid serves to absorb the

water formed by the reaction between the glycerine and the nitric acid and thus prevents the dilution of the nitric acid. When the reaction is completed, the charge in the nitrator is run off into a separating tank and allowed to stand until the nitroglycerine (a heavy oily liquid) has separated by flotation from the acid. After separation, the nitroglycerine is drawn off to washing tanks where it is repeatedly washed with small amounts of water, compressed air being frequently used for mixing. It is then washed with a weak solution of sodium carbonate to neutralize any acid that may not have been removed by the wash water. This neutralization is followed by washings with clear water until the alkali has been entirely removed. After washing, the nitroglycerine is placed in a lead lined storage tank to allow the water to separate and the nitroglycerine is withdrawn as a clear yellow oil ready for use.

FLOW MEASUREMENTS AND SAMPLING

A single 12″ sewer carried all the wastes from the plant. The sewer was carried as a closed tile pipe through the manholes and was laid on a steep grade. This made it inadvisable to install a weir, so an opening large enough to make it possible to take samples was made in the top of the pipe in one of the manholes. The depth of flow in the pipe was measured through this opening and flows were calculated by the Chezy formula for flows in open channels, using the Kutter formula to determine the coefficient of flow.

Samples were taken every 90 minutes over 24 hours every other day for a period of 2 weeks. These individual samples were composited in accordance with the flow measurements into 24-hour samples and all analyses were made on these composite samples.

ANALYTICAL DETERMINATIONS

The following determinations were made on the wastes from the manufacture of nitroglycerine: color; odor; pH; acidity, both methyl red and phenolphthalein; alkalinity; total solids, volatile and ash; suspended solids, volatile and ash; nitrite and nitrate nitrogen; soap hardness; oxygen consumed; and 5-day biochemical oxygen demand (B. O. D.)

All analyses, with the following exceptions, were made in accordance with the procedures given in "Standard Methods of Analysis for Water and Sewage, Eighth Edition." Color was determined by use of a standard comparator using glass standards based on the cobalt scale. Sulfates were determined gravimetrically by precipitation with barium chloride. Oxygen consumed was determined by digestion with potassium dichromate instead of permanganate.

RESULTS AND DISCUSSION

Table 1 gives the analytical results of the 24-hour composite samples. These results, particularly the acidity, would indicate offhand very erratic operation of the plant. However, data on the daily use of raw materials and daily production (not quoted) show that the plant was in remarkably uniform operation. The only explanation that can be given for the extreme variation from day to day in the analytical results is that the sampling interval inadvertently approximated very closely a multiple of the normal plant operating cycle. Such approximation would lead to taking samples from nearly the same point in

TABLE 1.—*Analytical results*

Sample day	Relative flow[1]	pH	Color	Odor concentration	p. p. m. Acidity: Methyl red	Acidity: Phenolphthalein	Alkalinity	SO_4	Nitrogen: NO_2	Nitrogen: NO_3	Total solids: Volatile	Total solids: Ash	Suspended solids: Volatile	Suspended solids: Ash	5-day B. O. D.	Oxygen consumed	Soap hardness
1	90	6.0	20	4	----	------	43	37	5.0	140	195	401	6	4	4.5	Trace	38
2	104	>9.6	50	1	----	------	385	61	9.0	110	633	147	5	7	6.3	8.4	28
3	103	>9.6	45	1	----	------	407	32	17.0	80	200	750	3	1	7.6	16.6	21
4	90	1.7	15	4	774	834	----	22	6.0	180	260	496	9	5	7.3	65.4	96
5	92	6.3	----	1	----	------	131	63	11.0	300	497	437	4	8	25.5	36.4	47
6	102	>9.6	60	1	----	------	449	81	8.0	200	250	920	12	20	11.5	25.2	22
7	99	>9.6	38	1	----	------	236	32	8.0	160	284	318	2	4	4.7	34.4	30
8	109	<1.6	28	1	936	1,050	----	253	7.0	700	357	377	6	23	4.2	57.4	168
9	111	2.1	8	2	257	300	----	116	4.0	260	370	420	3	0	3.7	47.8	97
Average	100	------	32	1.8	218	242	184	77	8.3	237	338	474	6	8	8.4	32.4	61
Maximum	111	>9.6	60	4	936	1,050	449	253	17.0	700	633	750	12	23	25.5	65.4	168
Minimum	90	<1.6	8	1	0	0	0	22	4.0	80	195	147	2	0	3.7	Trace	21

[1] Percent of average.

the operating cycle over the 24 hours. Examination of the daily results, however, would seem to indicate that during the nine sampling days, the sampling time was fairly well distributed over the manufacturing cycle and that the average results should be reasonably reliable.

Table 2 shows the quantities of waste products that were found per 1,000 pounds of nitroglycerine manufactured.

Examination of the results obtained from the survey at this one plant would indicate that, except for the intermittent acidity, the waste from nitroglycerine manufacture would not cause serious difficulty in the receiving stream. Organic matter is low, the 5-day B. O. D. being generally lower than that of the effluent from a municipal sewage treatment plant with secondary treatment. Sulfates and soap hardness may be slightly high, but should not cause any serious difficulty. The nitrate nitrogen content might cause increased algal growth but is not as high as that from a smokeless powder plant. It

would seem that neutralization of the acid would be the only treatment required. This neutralization would be greatly aided by an adequate balancing pond ahead of the neutralization plant to prevent the passage of sudden flushes of strongly acid waste through the plant without adequate neutralization. In many cases such a balancing pond, if of sufficient size, would be all the treatment needed.

TABLE 2.—*Waste quantities per 1,000 lbs. of explosive*

Sample day	1	2	3	4	5	6	7	8	9	Average
Flow .... million gallons..	0.020	0.029	0.029	0.026	0.026	0.029	0.028	0.031	0.031	0.0276
Free mineral acid as H_2SO_4 pounds..	0	0	0	165	0	0	0	240	67	51.0
Alkalinity as $CaCO_3$..do....	7	95	143	0	28	108	55	0	0	47.4
Sulfates..................do....	6	15	11	5	14	20	7	65	30	18.9
NO_2 nitrogen..........do....	0.8	2.2	6.0	1.3	2.4	1.9	1.9	1.8	1.0	2.11
NO_3 nitrogen..........do....	23.8	27.0	28.1	38.3	65.4	48.2	37.3	180	68.0	57.4
Total solids:										
Volatile............do....	33	155	70	55	108	60	66	92	97	80.7
Ash..................do....	68	36	264	105	95	222	74	97	109	117.5
Suspended solids:										
Volatile............do....	1.0	1.2	1.1	1.9	0.9	2.9	0.7	1.5	0.8	1.80
Ash..................do....	0.7	1.7	0.4	1.1	1.7	4.8	0.9	5.9	0	1.88
Oxygen consumed.....do....	0	2.1	5.8	13.9	7.9	6.1	8.0	14.7	12.5	7.70
5-day B. O. D..........do....	0.8	1.5	2.7	1.6	5.6	2.8	1.1	1.1	1.0	1.97
Population equivalent (B. O. D.)................	4.5	9.1	15.7	9.1	32.6	16.3	6.5	6.4	5.7	11.58
Total hardness as $CaCO_3$ pounds..	6	7	7	20	10	5	7	43	25	14.4

PREVALENCE OF POLIOMYELITIS

During the first half of the current year, a total of 1,084 cases of poliomyelitis was reported in the United States, of which more than 58 percent occurred in three States—California (350), Texas (240), and Arizona (46). The next highest figure (37) was for New York State.

In California an unusual incidence was noted from the first of the year, especially in Los Angeles County, and has continued to date. During the latter part of the second quarter of the year, rather sharp increases were reported in Kern and Fresno Counties, and, during the third quarter, in the San Francisco and the north central areas, including Santa Clara, Contra Costa, San Francisco, Sonoma, Solano, and Calaveras Counties.

In Arizona the first reported cases occurred in Pinal, Maricopa, and Yuma Counties. Up to the end of May, 31 cases had been reported in these three counties, and they were the only counties in the State which had reported cases. During June, 1 case each was reported in three additional counties, Yavapai, Gila, and Greenlee.

In Texas from 4 to 9 cases were reported weekly during January, but the incidence declined during February, March, and April. It began to increase again in June, and by the end of July about 100 cases were being reported weekly in the State. The earliest cases (reported during January), and the highest incidence up to the end

of May, occurred in Bexar County. One or two cases were reported in a few other (36) scattering counties up to the end of May. During June a rapidly increasing incidence began to be reported in Harris, Dallas, Tarrant, Galveston, and Lamar Counties. These counties have reported the largest numbers of cases to date.

During the first part of July, the incidence of the disease increased rapidly in Oklahoma and continued an upward trend in both California and Texas. In the last week of July, a sharp rise in the numbers of cases was reported in Kansas, and during August increases were noted in Colorado, Utah, Washington, Missouri, Kentucky, Nebraska, Iowa, Illinois, Connecticut, Rhode Island, and Massachusetts. The accompanying table shows the cases reported, by States, from January to July 3, and by weeks from July 3 to September 11. The South Atlantic States, most of the East South Central States, the northern New England States, and the three northern Mountain States have been comparatively free from the disease to date.

Poliomyelitis cases reported, by States, January–September 11, 1943

Division and State	Cases reported											Total, January–September 11	
	January–July 3	Week ended—										Number of cases	Case rate per 100,000 population (annual basis)
		July				August				September			
		10	17	24	31	7	14	21	28	4	11		
New England States:													
Maine	4	----	2	----	----	----	----	----	2	1	2	11	2.0
New Hampshire	1	----	----	----	----	----	----	----	----	1	----	2	0.6
Vermont	1	----	----	----	2	2	----	----	1	----	3	9	4.0
Massachusetts	17	----	----	----	1	----	1	7	8	20	23	77	2.7
Rhode Island	4	----	1	1	1	6	8	8	12	11	10	62	12.8
Connecticut	4	1	3	2	7	24	27	47	39	44	25	223	18.4
Middle Atlantic States:													
New York	37	5	11	10	10	18	30	42	42	58	68	331	3.7
New Jersey	10	1	----	----	3	1	5	----	6	9	7	42	1.5
Pennsylvania	17	----	3	2	----	1	3	4	9	5	8	52	0.8
East North Central States:													
Ohio	14	3	----	2	5	6	1	14	11	18	20	94	2.0
Indiana	8	----	----	1	2	1	3	1	19	3	16	54	2.3
Illinois	14	5	2	7	6	34	70	117	194	192	189	830	15.7
Michigan	12	----	2	1	8	4	4	11	9	18	34	103	2.8
Wisconsin	11	----	----	1	----	1	1	1	8	18	14	55	2.7
West North Central States:													
Minnesota	5	2	2	----	2	6	5	14	10	11	14	71	4.0
Iowa	6	1	2	----	----	1	5	8	13	33	23	92	5.8
Missouri	12	----	4	4	8	7	11	14	24	30	21	135	5.5
North Dakota	0	1	----	----	----	----	2	1	1	2	----	7	1.9
South Dakota	3	----	----	----	----	1	----	----	----	----	3	7	1.8
Nebraska	8	----	----	1	----	3	5	5	17	17	30	86	10.4
Kansas	17	5	7	7	30	43	89	76	66	90	47	477	40.5
South Atlantic States:													
Delaware	0	----	----	----	----	----	----	----	----	3	1	4	2.1
Maryland	0	----	1	1	1	----	----	----	1	----	----	4	0.3
District of Columbia	2	----	----	----	----	----	----	----	----	----	2	4	0.7
Virginia	16	1	1	2	3	2	3	4	1	----	3	36	1.9
West Virginia	7	----	----	----	1	----	2	1	4	----	1	16	1.3
North Carolina	9	----	1	3	1	2	3	1	1	3	2	26	1.1
South Carolina	7	----	----	2	----	----	----	1	2	1	----	13	1.0
Georgia	6	----	1	1	1	1	----	----	1	1	1	13	0.6
Florida	12	----	2	----	----	----	----	----	----	----	----	14	1.0

Poliomyelitis cases reported, by States, January–September 11, 1943—Continued

Division and State	Cases reported: January–July 3	Week ended— July 10	July 17	July 24	July 31	August 7	August 14	August 21	August 28	September 4	September 11	Total, January–September 11: Number of cases	Case rate per 100,000 population (annual basis)
East South Central States:													
Kentucky	22	2			11	8	3	22	16	10	8	102	5.7
Tennessee	7	3					1	2		2	2	17	0.9
Alabama	15	1	3		2	1	1	2	3		2	30	1.6
Mississippi	16		2		1	2		3	1	2		27	1.9
West South Central States:													
Arkansas	20	3	7	6	6	4	5	8	4	1	1	65	5.2
Louisiana	10			10		4	7	6	2	1	3	43	2.7
Oklahoma	33	44	39	42	30	52	40	38	36	17	36	407	28.0
Texas	240	90	102	96	105	62	67	52	75	62	50	1,001	22.9
Mountain States:													
Montana	0									9		9	2.8
Idaho	2							1			2	5	1.5
Wyoming	2								1	5	3	11	7.0
Colorado	7	1	1	5		15	7	20	21	20	35	132	18.1
New Mexico	8		1	2	1	5	5	1	4	12	3	42	12.4
Arizona	46		3	4		1	2	5	8	1	7	77	19.4
Utah	14		2		3	6	9	16	13	76	40	179	44.4
Nevada	1	1	2			2					3	9	9.8
Pacific States:													
Washington	20			2	2	5	13	20	25	19	7	113	8.9
Oregon	7			3	4	8	13	11	24	16	26	112	14.2
California	350	75	90	111	104	111	94	163	138	114	111	1,461	28.6
Total	1,084	245	297	329	361	450	545	747	872	956	906	6,792	
Total to date	1,084	1,329	1,626	1,955	2,316	2,766	3,311	4,058	4,930	5,886	6,792	6,792	7.7

A total of 6,792 cases of poliomyelitis has been reported in the United States this year up to September 11. The following table shows the numbers of cases reported for the corresponding period and for the entire year for the years 1934–42, together with the percentage of the total cases that occurred in the 36-week period and the date of the peak week of the year:

Cases of poliomyelitis reported in the United States 1934–42 [1]

Year	First 36 weeks of year (approximately January–Sept. 11)	Total, 52 weeks [2]	Percent reported during first 36 weeks	Date of peak week of year
1934	4,980	7,274	68	June 23.
1935	6,424	10,732	60	August 31.
1936	1,822	4,494	41	October 3.
1937	5,512	9,451	58	September 18.
1938	1,162	1,709	68	August 27.
1939	3,445	7,288	47	September 16.
1940	4,059	9,769	42	September 14.
1941	4,611	9,056	51	August 30.
1942	2,169	4,193	52	September 12.

[1] Figures are totals of weekly telegraphic reports received from the State health officers and are slightly less in most instances than those published in the annual summaries, which are based on final reports.
[2] For case rates by geographic divisions, 1934–42, see Public Health Reports for July 16, 1943, p. 1110.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 11, 1943

Summary

The incidence of poliomyelitis declined slightly during the week. A total of 906 cases was reported, as compared with 956 for the preceding week and 436 for the 5-year (1938–42) median. States reporting the largest numbers (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 23 (20), New York 68 (58), Ohio 20 (18), Michigan 34 (18), Nebraska 30 (17) Oklahoma 36 (17), Colorado 35 (20), and Oregon 26 (16); *decreases*—Connecticut 25 (44), Illinois 189 (192), Iowa 23 (33), Kansas 47 (90), Texas 50 (62), Utah 40 (76, delayed reports included), and California 111 (114). The cumulative total for the first 36 weeks of the year is 6,792, as compared with 2,169 for the same period of 1942 and a 5-year median of 3,445. (See also p. 1412.)

A total of 173 cases of meningococcus meningitis was reported, as compared with 151 last week and a 5-year median of 36. States reporting the largest numbers (last week's figures in parentheses) are as follows: New York 23 (19), California 17 (14), Massachusetts 13 (4), Pennsylvania 13 (14). No other State reported more than 9 cases. The cumulative total for the first 36 weeks of the year is 14,018, as compared with 2,541 for the same period last year and a 5-year median of 1,514.

Cumulative totals for the first 36 weeks of the year for other diseases included in the following table (corresponding figures for last year in parentheses) are as follows: Anthrax 47 (61), diphtheria 8,010 (8,192), dysentery, all forms, 15,683 (11,967), infectious encephalitis 503 (377), influenza 83,394 (82,365), leprosy 19 (35), measles 540,027 (468,385), Rocky Mountain spotted fever 391 (406), scarlet fever 100,121 (91,272), smallpox 618 (625), tularemia 625 (691), typhoid and paratyphoid fever 3,849 (4,700), endemic typhus fever 2,628 (2,232), whooping cough 139,920 (130,991).

A total of 6,985 deaths was recorded in 89 large cities of the United States for the current week, as compared with 7,195 last week and a 3-year (1940–42) average of 6,796. The cumulative total for the first 36 weeks of the year is 305,119, as compared with 278,612 for the comparable period last year.

Telegraphic morbidity reports from State health officers for the week ended September 11, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42
	Sept. 11, 1943	Sept. 12, 1942		Sept. 11, 1943	Sept. 12, 1942		Sept. 11, 1943	Sept. 12, 1942		Sept. 11, 1943	Sept. 12, 1942	
NEW ENGLAND												
Maine	1	1	1	-----	-----	-----	7	4	4	1	1	0
New Hampshire	0	0	0	-----	-----	-----	0	4	0	0	0	0
Vermont	3	0	0	-----	-----	-----	7	4	4	0	0	0
Massachusetts	1	3	2	-----	-----	-----	52	41	31	13	2	1
Rhode Island	0	1	0	-----	-----	-----	10	5	1	2	1	0
Connecticut	1	1	0	2	1	-----	11	5	5	8	1	0
MIDDLE ATLANTIC												
New York	8	5	8	-----	[1] 2	[1] 1	73	21	71	23	6	3
New Jersey	3	3	3	1	7	5	77	20	20	9	4	1
Pennsylvania	5	3	10	-----	1	-----	22	36	33	13	4	4
EAST NORTH CENTRAL												
Ohio	11	3	10	2	6	6	22	12	12	5	0	1
Indiana	4	6	6	1	-----	8	18	8	5	3	0	0
Illinois	7	14	14	3	4	3	83	9	21	9	2	2
Michigan [2]	2	3	3	1	2	-----	93	23	13	8	0	0
Wisconsin	0	0	1	10	17	15	90	54	53	5	0	0
WEST NORTH CENTRAL												
Minnesota	3	0	5	-----	1	1	54	9	9	1	0	0
Iowa	4	3	3	-----	1	1	3	4	4	5	0	0
Missouri	9	3	4	1	-----	1	5	9	6	6	1	0
North Dakota	2	0	1	1	-----	1	3	0	1	1	0	0
South Dakota	1	4	2	-----	1	-----	1	2	2	1	3	0
Nebraska	3	4	0	3	1	-----	5	15	1	0	0	0
Kansas	3	2	3	4	3	1	3	3	8	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	-----	-----	-----	8	1	1	0	0	0
Maryland [2]	1	1	1	-----	2	1	16	9	5	2	4	1
District of Columbia	0	8	1	1	-----	-----	4	4	2	2	1	0
Virginia	12	22	22	65	138	77	36	8	8	4	2	2
West Virginia	8	16	7	-----	2	5	11	1	1	2	1	1
North Carolina	34	38	38	-----	4	1	10	10	10	1	1	1
South Carolina	15	25	30	142	227	179	11	10	10	1	2	0
Georgia	19	31	31	1	11	14	6	0	1	1	2	1
Florida	6	2	8	2	-----	1	4	10	4	0	0	0
EAST SOUTH CENTRAL												
Kentucky	4	5	9	2	-----	1	4	20	6	1	0	1
Tennessee	14	12	16	6	3	11	4	17	17	6	2	1
Alabama	49	17	33	9	24	24	23	8	8	8	1	1
Mississippi [2]	10	8	18	-----	-----	-----	-----	-----	-----	5	0	1
WEST SOUTH CENTRAL												
Arkansas	7	13	15	3	5	4	8	5	5	1	0	0
Louisiana	5	4	4	6	5	1	2	2	2	4	1	0
Oklahoma	2	6	6	2	19	19	0	6	6	2	0	0
Texas	18	32	32	273	143	101	25	2	15	2	1	1
MOUNTAIN												
Montana	3	0	0	-----	1	4	18	2	2	1	0	0
Idaho	0	0	0	1	-----	-----	0	0	0	0	0	0
Wyoming	0	0	0	-----	15	-----	14	5	3	0	1	0
Colorado	18	8	8	4	19	10	2	5	9	3	0	1
New Mexico	0	2	4	-----	1	-----	1	0	0	0	0	0
Arizona	0	1	1	21	27	14	2	1	3	3	0	0
Utah [2]	0	0	0	-----	3	2	1	15	9	0	0	0
Nevada	0	0	-----	-----	-----	-----	6	0	-----	0	0	-----
PACIFIC												
Washington	3	5	1	-----	-----	-----	5	35	8	1	0	0
Oregon	8	1	1	-----	2	3	31	21	7	2	1	0
California	12	10	10	14	9	9	55	47	47	17	1	0
Total	314	321	360	581	707	511	881	527	527	173	46	36
36 weeks	8,010	8,192	9,458	83,394	82,365	152,791	540,027	468,385	468,385	14,018	2,541	1,514

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 11, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Sept. 11, 1943	Sept. 12, 1942		Sept. 11, 1943	Sept. 12, 1942		Sept. 11, 1943	Sept. 12, 1942		Sept. 11, 1943	Sept. 12, 1942	
NEW ENGLAND												
Maine	2	4	2	4	5	1	0	0	0	0	1	1
New Hampshire	0	0	0	2	3	1	0	0	0	0	0	0
Vermont	3	4	0	3	2	2	0	0	0	1	2	0
Massachusetts	23	1	3	58	58	23	0	0	0	7	2	2
Rhode Island	10	1	0	4	1	1	0	0	0	1	1	0
Connecticut	25	5	4	15	13	8	0	0	0	1	0	1
MIDDLE ATLANTIC												
New York	68	29	29	51	59	59	0	0	0	2	16	17
New Jersey	7	22	22	13	26	26	0	0	0	3	6	6
Pennsylvania	8	7	11	35	47	47	0	0	0	12	15	22
EAST NORTH CENTRAL												
Ohio	20	13	17	65	41	52	0	0	0	7	6	22
Indiana	16	11	4	15	16	16	0	0	0	4	5	9
Illinois	189	44	21	56	39	72	0	0	0	8	9	17
Michigan [3]	34	10	10	31	32	47	0	0	0	7	0	6
Wisconsin	14	1	5	44	38	46	0	0	0	1	1	2
WEST NORTH CENTRAL												
Minnesota	14	3	12	18	15	20	0	0	0	0	0	0
Iowa	23	8	3	15	11	13	0	0	0	1	2	3
Missouri	21	8	1	7	28	19	0	0	0	7	8	9
North Dakota	0	1	1	0	4	4	0	0	0	0	1	1
South Dakota	3	0	0	5	9	4	0	1	0	0	0	0
Nebraska	30	8	1	12	4	4	0	0	0	0	0	0
Kansas	47	4	4	21	14	30	0	1	0	2	2	5
SOUTH ATLANTIC												
Delaware	1	0	0	2	1	1	0	0	0	1	2	2
Maryland [3]	0	2	2	8	9	13	0	0	0	0	2	5
District of Columbia	2	0	2	1	6	8	0	0	0	1	0	1
Virginia	3	9	9	28	22	18	0	0	0	10	11	16
West Virginia	1	3	2	32	32	19	0	0	0	9	4	9
North Carolina	[4] 2	7	7	52	43	34	0	0	0	2	4	9
South Carolina	0	3	3	5	16	12	0	0	0	6	8	18
Georgia	1	3	2	12	23	16	0	0	0	5	1	15
Florida	0	0	0	2	1	4	0	0	0	1	1	1
EAST SOUTH CENTRAL												
Kentucky	8	6	6	10	21	23	0	0	0	11	11	27
Tennessee	2	13	3	28	49	28	2	0	0	9	18	27
Alabama	2	1	2	14	32	16	0	0	0	0	1	12
Mississippi [3]	0	4	1	6	11	9	0	0	0	12	2	7
WEST SOUTH CENTRAL												
Arkansas	1	6	1	0	8	4	0	0	0	3	6	24
Louisiana	3	5	2	5	3	3	0	0	0	24	11	12
Oklahoma	36	1	1	0	19	11	0	0	0	17	5	28
Texas	50	6	4	20	10	20	0	1	0	10	21	40
MOUNTAIN												
Montana	0	0	0	6	9	4	0	0	0	0	2	2
Idaho	2	0	0	3	2	2	0	0	0	0	1	2
Wyoming	3	0	0	3	1	1	0	0	0	0	0	0
Colorado	35	0	3	14	8	8	0	0	0	2	1	6
New Mexico	3	1	1	2	1	1	0	0	0	2	2	5
Arizona	7	2	0	3	0	1	0	0	0	4	2	3
Utah [3]	40	0	0	7	3	4	0	0	0	0	0	0
Nevada	3	0	------	2	0	------	0	0	0	0	2	------
PACIFIC												
Washington	7	1	1	17	7	10	0	1	0	1	6	2
Oregon	26	0	4	6	4	4	0	0	0	2	6	2
California	111	10	10	42	29	42	0	0	0	3	1	7
Total	906	267	436	804	830	830	2	4	4	194	202	463
36 weeks	[4] 6,792	2,169	3,445	100,1[illegible]	91,272	118,940	618	625	1,988	3,849	4,700	6,247

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 11, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough, Week ended Sept. 11, 1943	Whooping cough, Week ended Sept. 12, 1942	Whooping cough, Median 1938–42	Week ended Sept. 11, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	16	40	26	0	0	0	0	0	0	0	0	0
New Hampshire	0	1	0	0	0	0	0	0	0	0	0	0
Vermont	16	46	20	0	0	0	0	0	0	0	0	0
Massachusetts	53	201	81	0	0	5	0	1	0	0	0	0
Rhode Island	38	4	6	0	0	0	0	0	0	0	0	0
Connecticut	34	69	52	0	0	5	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	204	325	[illegible]	1	5	164	0	2	0	0	0	0
New Jersey	115	197	157	1	0	0	0	1	0	2	0	0
Pennsylvania	128	247	250	1	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	117	160	167	0	0	1	0	0	0	0	0	0
Indiana	68	56	26	0	0	0	0	0	0	1	0	0
Illinois	171	385	231	0	0	2	0	8	0	0	1	0
Michigan [3]	[illegible]	226	190	0	0	10	0	0	0	0	0	0
Wisconsin	184	194	194	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	32	18	48	0	2	0	0	0	0	0	0	0
Iowa	35	19	19	0	0	0	0	0	0	0	0	0
Missouri	14	14	[illegible]	0	0	0	3	1	0	0	1	0
North Dakota	79	6	17	0	0	0	0	0	0	0	0	0
South Dakota	4	4	[illegible]	0	0	0	0	0	0	0	0	0
Nebraska	15	15	[illegible]	0	0	0	0	0	0	0	0	0
Kansas	20	14	33	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	2	0	5	0	0	0	0	0	0	0	0	0
Maryland [2]	71	43	43	0	0	0	12	0	0	0	0	0
District of Columbia	9	26	11	0	0	0	0	0	0	0	0	0
Virginia	119	24	29	0	0	0	340	0	0	3	1	0
West Virginia	28	[illegible]	11	0	0	0	0	0	0	0	0	0
North Carolina	80	[illegible]	109	0	0	1	0	0	0	0	0	2
South Carolina	63	51	36	0	0	18	0	0	0	0	0	5
Georgia	29	33	[illegible]	0	0	3	2	0	0	0	1	64
Florida	21	[illegible]	2	0	12	1	1	0	0	0	0	8
EAST SOUTH CENTRAL												
Kentucky	40	29	41	0	0	0	0	0	0	0	1	0
Tennessee	34	63	35	[illegible]	0	0	[illegible]	0	0	0	2	5
Alabama	1	40	14	0	0	0	0	0	0	0	0	14
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	1	3
WEST SOUTH CENTRAL												
Arkansas	14	14	14	0	1	5	0	0	0	0	2	0
Louisiana	1	[illegible]	4	0	0	12	0	0	0	0	0	8
Oklahoma	9	4	8	0	0	0	0	0	0	0	0	0
Texas	134	88	88	0	35	218	0	0	0	0	0	49
MOUNTAIN												
Montana	7	20	10	0	0	0	0	0	0	0	0	0
Idaho	4	3	5	0	0	0	0	0	0	0	0	0
Wyoming	3	6	5	0	0	0	0	0	0	1	1	0
Colorado	61	10	23	0	0	22	0	0	0	1	0	0
New Mexico	11	6	6	0	0	7	1	0	0	0	0	0
Arizona	3	3	[illegible]	0	1	0	20	0	0	0	0	0
Utah [2]	[illegible]	10	24	0	0	0	0	0	0	0	0	0
Nevada	1	4	------	0	0	0	0	0	0	0	2	0
PACIFIC												
Washington	23	25	25	0	0	2	0	1	0	0	0	0
Oregon	39	6	29	[illegible]	0	0	0	0	0	0	0	0
California	72	114	113	0	4	6	0	18	0	0	0	1
Total	2,491	2,945	[illegible]	5	60	182	330	28	0	8	14	159
36 weeks	136,920	130,991	154,239	47	1,495	11,578	670	503	19	391	625	2,628
36 weeks, 1942	----	----	----	61	764	6,310	4,893	377	35	406	691	2,232

[1] New York City only.

[2] Period ended earlier than Saturday.

[3] Including paratyphoid fever cases reported separately as follows: Michigan, 1; Massachusetts, 7; New Mexico, 1; South Carolina, 3; Texas, 1; California, 1.

[4] Late information shows 3 cases in North Carolina for week ended Aug. 14, 1943, instead of 4 as previously reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 28, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	0	2	2	0	2	0	0	1
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	2	0	1	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	6	2	6	4	17	0	0	24
Fall River	0	0	------	0	1	0	0	1	2	0	0	0
Springfield	0	0	------	0	3	0	0	1	1	0	0	0
Worcester	0	0	------	0	0	0	2	0	4	0	0	2
Rhode Island:												
Providence	0	0	1	0	7	1	2	5	1	0	0	7
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	1	1	0	1	0
Hartford	0	0	------	0	1	2	1	1	1	0	0	3
New Haven	0	0	------	0	0	0	0	17	1	0	1	6
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	0	3	2	6	1	0	0	9
New York	8	0	------	0	60	12	38	22	25	0	4	96
Rochester	0	0	------	0	1	1	5	1	1	0	0	11
Syracuse	0	0	------	0	1	0	3	0	2	0	0	17
New Jersey:												
Camden	1	0	------	0	0	0	0	0	0	0	0	2
Newark	0	0	------	1	7	0	4	0	2	0	1	30
Trenton	0	0	1	0	0	0	1	0	0	0	0	0
Pennsylvania:												
Philadelphia	2	0	2	0	1	10	13	1	10	0	0	93
Pittsburgh	4	1	------	0	7	1	11	1	3	0	2	12
Reading	0	0	------	0	1	0	0	0	0	0	1	10
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	1	0	3	0	1	0	0	5
Cleveland	1	0	2	1	0	2	3	3	13	0	0	40
Columbus	1	0	1	1	2	0	0	0	5	0	0	3
Indiana:												
Fort Wayne	0	0	------	0	0	0	0	0	0	0	0	0
Indianapolis	0	0	------	0	0	1	0	0	0	0	0	19
South Bend	0	0	------	0	2	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	1	0
Illinois:												
Chicago	1	0	------	0	12	8	17	136	13	0	3	80
Springfield	0	0	------	0	0	1	0	0	1	0	0	0
Michigan:												
Detroit	1	0	------	0	14	5	11	0	0	0	0	47
Flint	0	0	------	0	0	0	0	0	1	0	0	2
Grand Rapids	0	0	------	0	6	0	0	0	0	0	0	13
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	1	0	0	0
Milwaukee	0	0	------	0	5	2	2	0	2	0	0	89
Racine	0	0	------	0	1	0	0	0	1	0	0	8
Superior	0	0	------	0	17	0	0	0	0	0	0	6
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	6	0	0	1	0	0	0	9
Minneapolis	0	0	------	0	3	0	3	6	8	0	1	1
St. Paul	0	0	------	0	3	0	4	2	1	0	0	19
Missouri:												
Kansas City	0	0	------	0	3	2	5	11	6	0	0	8
St. Louis	0	0	1	0	2	1	7	2	9	0	0	17

City reports for week ended August 28, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza: Cases	Influenza: Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENRAL—continued												
North Dakota:												
Fargo	0	0	------	0	4	0	0	1	0	0	0	1
Nebraska:												
Omaha	4	0	------	0	0	0	0	8	0	0	0	1
Kansas:												
Topeka	0	0	------	0	1	0	0	2	3	0	0	8
Wichita	0	0	------	0	0	0	1	3	2	0	0	5
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	1	------	0	0	0	0	0	1	0	0	5
Maryland:												
Baltimore	1	0	1	0	3	2	7	1	9	0	1	71
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	1	6	0	3	0	3	0	0	26
Virginia:												
Lynchburg	0	0	------	0	11	0	1	0	2	0	0	6
Richmond	0	0	------	0	0	0	0	1	1	0	0	1
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Wheeling	0	0	------	0	0	0	1	0	1	0	0	12
North Carolina:												
Raleigh	0	0	------	0	0	0	0	0	0	0	0	0
Winston-Salem	1	0	------	0	0	0	2	0	3	0	0	9
South Carolina:												
Charleston	1	0	2	0	1	0	1	0	0	0	0	0
Georgia:												
Atlanta	1	0	------	0	0	0	1	0	4	0	1	0
Brunswick	0	0	------	0	0	0	1	0	0	0	0	0
Savannah	0	0	------	0	0	1	2	0	1	0	0	0
Florida:												
Tampa	0	0	1	1	0	1	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	0	0	1	0	4	0	0	11
Nashville	0	0	------	0	1	0	0	0	1	0	0	7
Alabama:												
Birmingham	0	0	1	0	1	2	1	0	2	0	0	4
Mobile	1	0	------	1	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	0	0	0	0	0	0
Louisiana:												
New Orleans	0	0	1	1	1	0	4	3	0	0	1	4
Shreveport	0	0	------	0	0	0	3	1	0	0	5	0
Texas:												
Dallas	0	0	------	0	0	0	2	8	1	0	1	8
Galveston	0	0	------	0	0	0	0	0	0	0	1	0
Houston	0	0	------	0	4	0	3	2	0	0	0	6
San Antonio	1	0	1	1	0	0	3	2	1	0	1	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	2	0	0	0	0	0	0	1
Great Falls	0	0	------	0	2	0	0	0	0	0	0	5
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	1

City reports for week ended August 28, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
MOUNTAIN—continued												
Colorado:												
Denver	0	0	1	0	4	0	3	6	1	0	0	22
Pueblo	0	0	------	0	1	0	0	5	3	0	0	6
Utah:												
Salt Lake City	0	0	------	0	2	0	0	3	0	0	0	20
PACIFIC												
Washington:												
Seattle	1	0	------	0	13	0	1	4	0	0	0	14
Spokane	2	0	------	0	2	0	0	1	4	0	0	6
Tacoma	1	0	------	0	1	0	0	0	0	0	0	6
California:												
Los Angeles	8	1	8	0	22	3	4	25	10	0	2	36
Sacramento	3	0	------	0	0	0	0	9	0	0	0	1
San Francisco	0	0	1	0	8	0	10	7	2	0	0	22
Total	40	8	20	8	263	65	202	314	197	0	29	1,014
Corresponding week, 1942	39	5	31	10	124	19	230	62	204	0	32	1,127
Average, 1938-42	51	------	30	[1] 8	[2] 176	------	[1] 206	------	190	2	52	1,224

Dysentery, amebic.—Cases: New York, 1.

Dysentery, bacillary.—Cases: Buffalo, 2; New York, 11; Rochester, 1; Chicago, 1; Detroit, 4; St. Louis, 1; Baltimore, 3; Charleston, S. C., 6; Atlanta, 1; Los Angeles, 6.

Dysentery, unspecified.—Cases: Baltimore, 17; Richmond, 4; San Antonio, 3.

Rocky Mountain spotted fever.—Cases: Pittsburgh, 2.

Typhus fever.—Cases: Charleston, S. C., 7; Atlanta, 1; Brunswick, 2; Savannah, 12; Birmingham, 3; New Orleans, 1; Dallas, 3; Houston, 4; Los Angeles, 2.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,594,100)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	0.0	0.0	2.5	0.0	44.7	17.4	34.8	74.5	79.5	0.0	7.5	107
Middle Atlantic	6.7	0.4	1.3	0.4	34.8	12.0	34.3	13.8	19.6	0.0	3.6	125
East North Central	2.9	0.0	1.8	1.2	35.0	11.1	21.0	81.2	22.2	0.0	2.3	182
West North Central	8.0	0.0	2.0	0.0	44.1	6.0	40.1	72.2	58.1	0.0	2.0	138
South Atlantic	7.0	1.7	7.0	3.5	36.7	7.0	34.9	3.5	43.7	0.0	3.5	227
East South Central	5.9	0.0	5.9	5.9	11.9	11.9	11.9	0.0	41.6	0.0	0.0	131
West South Central	2.9	0.0	5.9	5.9	14.7	0.0	44.0	46.9	5.9	0.0	26.4	53
Mountain	0.0	0.0	8.0	0.0	88.4	0.0	24.1	112.6	32.2	0.0	0.0	442
Pacific	17.5	1.7	7.0	0.0	80.4	5.2	26.2	80.4	28.0	0.0	3.5	149
Total	6.0	0.5	3.0	1.2	39.6	9.8	30.4	47.3	29.7	0.0	4.4	153

PLAGUE INFECTION IN CALIFORNIA, COLORADO, AND MONTANA

Plague infection has been reported proved in pools of fleas, ticks, and tissue from ground squirrels, *C. beecheyi*, and prairie dogs collected in California, Colorado, and Montana as follows:

CALIFORNIA

Kern County.—July 9, in pools of 504 fleas from 48 ground squirrels (3 lots), taken on a ranch at Bear Valley, 6 miles north of California Institution for Women, and 65 lice from 48 ground squirrels from the same location; July 12, 54 fleas from 7 ground squirrels taken on a ranch 1 mile west of Cummings Valley School.

Monterey County.—From a ranch 10 miles south and 14 miles east of Monterey—July 1, a pool of 200 fleas from 35 ground squirrels, 2 pools, each of 175 fleas from 35 ground squirrels, 29 ticks from 35 ground squirrels, and 145 fleas from 35 ground squirrels; July 2, 26 ticks from 29 ground squirrels, 250 fleas from 29 ground squirrels (2 lots); July 13, 2 pools, each of 200 fleas from 16 ground squirrels; from an estate 12 miles south and 12 miles east of Monterey—July 9, 2 pools, each of 175 fleas from 33 ground squirrels, 190 fleas from 33 ground squirrels, 200 fleas from 33 ground squirrels; July 12, 175 fleas from 27 ground squirrels, and 700 fleas from 27 ground squirrels (4 lots); from a ranch at Indian Valley, 11 miles east of Bradley—August 5, a pool of 6 ground squirrels.

COLORADO

Huerfano County.—August 16, 876 fleas from 97 prairie dogs (*Cynomys gunnisoni*) taken at a location 15 miles northwest of Walsenburg, on State Highway No. 69.

MONTANA

Garfield County.—In pools of fleas from prairie dogs (*Cynomys ludovicianus*) collected as follows: August 9, a pool of 50 fleas from 18 prairie dogs taken approximately 15 miles southwest of Jordan; August 10, 82 fleas from 82 prairie dogs taken 35 miles south of Jordan along State Highway No. 22; August 11, 94 fleas from 89 prairie dogs taken approximately 13 miles northwest of Jordan.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—Information dated September 2, 1943, states that 21 more cases of dengue fever have been reported in the city of Honolulu, T. H., bringing the total number of cases reported to date to 165.

Plague (human).—On August 22, 1943, 1 death from bubonic plague occurred in an 11-year-old female in Honokaa, Hamakua District, Island of Hawaii, T. H. This brings the total deaths from plague in Hamakua District to 5, the 4 previous deaths occurring on March 5, March 28, April 11, and May 3, 1943, respectively.

FOREIGN REPORTS

ANGOLA

Notifiable diseases—April–June 1943.—During the months of April, May, and June 1943, cases of certain notifiable diseases were reported in Angola as follows:

Disease	April		May		June	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Beriberi	12	3	18	2	19	2
Cerebrospinal meningitis	1		1		2	1
Chickenpox	14					
Diphtheria	1		2			
Dysentery (amebic)	159	7	194	7	143	6
Dysentery (bacillary)	10		2		6	2
Gonorrhea	308		231		267	
Grippe, infectious	1,073	14	1,151	23	1,244	17
Hookworm disease	721	4	454	6	419	9
Leprosy	7	1	6		7	
Lethargic encephalitis					2	1
Measles	153	13	172	8	83	3
Mumps	19	2	7		17	
Pneumonia	210	31	170	25	232	34
Poliomyelitis	5				1	
Rabies	1	1				
Relapsing fever	44	7	26		29	1
Scarlet fever			1	1		
Sleeping sickness	197	4	200	12	191	18
Smallpox	2		10		53	
Syphilis	399		468	1	464	2
Tetanus	7	2	1	1		
Trachoma					1	1
Tuberculosis (respiratory)	51	3	62	6	53	10
Typhoid and paratyphoid fever	17		9	1	6	
Whooping cough	370	10	334	24	281	21
Yaws	859		921		930	

CANADA

Provinces—Communicable diseases—Week ended August 14, 1943.—During the week ended August 14, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		7		15	77	3	15	15	19	151
Diphtheria		10	1	15			1		1	28
Dysentery (bacillary)				6						6
Encephalitis, infectious								1	1	2
German measles				1	6		1	7		15
Influenza					20	3			1	24
Measles		11	1	118	154	57	29	62	30	462
Meningitis, meningococcus		1			1					2
Mumps		28		4	51	17	2	23	27	152
Poliomyelitis				1	2		1	2		6
Scarlet fever		12	3	35	29	9	7	11	14	120
Tuberculosis (all forms)	7	2	7	95	42	18	20	4	26	221
Typhoid and paratyphoid fever			11	18	4					33
Undulant fever				12	3				1	16
Whooping cough		1		147	169	13	27	17	17	391

CUBA

Sagua La Grande—Typhoid fever.—According to reports received, typhoid fever has reached epidemic proportions in Sagua La Grande, Cuba. The following table shows the numbers of cases and deaths reported for the 6 weeks ended August 21, 1943:

Week ended—	Cases	Deaths	Week ended—	Cases	Deaths
July 17, 1943	23	2	Aug. 14, 1943	40	3
July 24, 1943	49	1	Aug. 21, 1943	23	3
July 31, 1943	45	7			
Aug. 7, 1943	29	0	Total	209	16

GERMANY

Infectious diseases—Week ended July 31, 1943, and January 1 to July 25, 1943—Comparative.—Cases of certain infectious diseases have been reported in Germany for the week ended July 31, 1943, and for the period January 1 to July 25, 1943, compared with the same period of 1942 as follows:

Disease	Week ended July 31, 1943	January 1-July 25—		Disease	Week ended July 31, 1943	January 1-July 25—	
		1943	1942			1943	1942
Anthrax		7	14	Psittacosis		16	3
Cerebrospinal meningitis	43	1,448	1,660	Ptomaine poisoning	31	526	1,093
Diphtheria	4,005	111,401	107,794	Scarlet fever	7,845	161,327	190,804
Dysentery (infectious)	72	1,440	1,876	Tuberculosis (all forms)	2,863	72,871	68,521
Inflammation of the brain	17	265	212	Typhoid fever	172	6,197	2,488
Koerner's disease	94	3,220	4,174	Weil's disease	1	45	7
Malaria	26	172	222	Whooping cough	2,258	65,981	27,712
Paratyphoid fever	59	2,084	764	Wounds by bites	12	316	367
Poliomyelitis	15	393	456				

SWEDEN

Notifiable diseases—June 1943.—During the month of June 1943, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	5	Poliomyelitis	23
Diphtheria	106	Scarlet fever	2,404
Dysentery	60	Syphilis	82
Encephalitis, epidemic	1	Typhoid fever	6
Gonorrhea	1,572	Undulant fever	8
Hepatitis, epidemic	245	Weil's disease	9
Paratyphoid fever	13		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Egypt—Port Said.—Plague has been reported in Port Said, Egypt, as follows: Weeks ended July 24, 1943, 2 cases; July 31, 1 death; August 7, 1 case; August 21, 1 case, 1 death.

French West Africa—Dakar.—For the period August 1–10, 1943, 3 cases of plague with 2 deaths were reported in Dakar, French West Africa.

Yellow Fever

Belgian Congo—Leopoldville Province—Kinzao.—On July 26, 1943, 1 death from yellow fever was reported in Kinzao, Leopoldville Province, Belgian Congo.

DEATHS DURING WEEK ENDED SEPTEMBER 4, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 4, 1943	Corresponding week, 1942
Data from 89 large cities of the United States:		
Total deaths	7,812	7,609
Average for 3 prior years	7,472	
Total deaths, first 35 weeks of year	322,451	294,979
Deaths under 1 year of age	594	631
Average for 3 prior years	538	
Deaths under 1 year of age, first 35 weeks of year	23,021	19,877
Data from industrial insurance companies:		
Policies in force	65,792,967	65,002,571
Number of death claims	10,624	10,125
Death claims per 1,000 policies in force, annual rate	8.4	8.1
Death claims per 1,000 policies, first 35 weeks of year, annual rate	9.9	9.3

COURT DECISIONS ON PUBLIC HEALTH

Typhus fever—contraction by bakery employee—liability of employer.—(Georgia Court of Appeals, Division No. 1; *Blair* v. *Fulton Bakery, Inc.*, 24 S.E.2d 598; decided March 6, 1943.) An action was brought against a bakery to recover damages for the alleged negligence of the defendant in failing to furnish the plaintiff with a safe and healthy place in which to work. The plaintiff, after working for about 9 months for the defendant as a baker, contracted typhus fever. Among other things, the plaintiff alleged that after becoming ill he learned that the defendant had contracted with people in the business of exterminating rats to spread rat poison to kill rats that lived and bred in the bakery and that the defendant negligently allowed the rats so killed to remain under some old and unused machinery and pieces of metal. As the proximate result of the defendant's so doing, the plaintiff alleged that he was bitten by fleas from such dead rats and contracted typhus fever. Another averment was that when a rat dies the fleas "then leave" the body of the rat and "seek out a live being on which to live and secure nourishment from said being's blood stream." The defendant demurred to the petition, thus admitting all facts well pleaded but challenging that they were legally sufficient to constitute a cause of action. The lower court found in the defendant's favor and its judgment was affirmed by the Court of Appeals of Georgia.

Following are some of the views expressed by the appellate court: An employer is not an insurer of the safety of his employees and is bound only to the exercise of reasonable care; it is as much a master's duty to use reasonable care to protect his servants against dangers of the employment which may reasonably be expected to produce disease as it is to use reasonable care to protect against dangers which may produce physical injuries; a master is bound to exercise ordinary care

in furnishing the servant a safe place in which to work, but the latter must exercise like care in discovering any defects therein; a master is not liable unless by the exercise of ordinary care and diligence he could have reasonably apprehended that his negligence would or might result in injury to some one of his servants; and an employer is not bound to foresee and give warning of remote, improbable, and exceptional occurrences, his duty being limited to such perils as reasonably are to be anticipated.

The court of appeals said that "to require of the defendant the duty of finding each dead rat and removing its body from the bakery before the fleas could leave the bodies, would be very much like demanding that the defendant do an impossible thing." According to the court there was nothing in the petition which constituted a sufficient allegation that the defendant knew or by the exercise of ordinary care should have known that any of its employees would contract typhus fever by reason of the rats being killed and left in the bakery.

Children bitten by rats—action against owners of adjoining premises.—(California District Court of Appeal, First District, Division 2; *Coole et al.* v. *Haskins et al.*, 135 P.2d 176; decided March 23, 1943.) The plaintiffs were children of 2 and 3 years of age, respectively. They brought an action to recover damages for personal injuries alleged to have been sustained when bitten by rats. The complaint alleged that they were bitten while sleeping in a portion of the premises owned by the defendants and rented to the parents of plaintiffs as a residence. The defendants operated a restaurant on an adjoining portion of the premises owned by them. Negligence and the maintenance of a nuisance were charged by the plaintiffs. It was alleged that discarded food and vegetable matter, refuse, and debris were allowed to accumulate about said premises and restaurant so that rats were attracted to and infested the same, thereby causing the premises to become unfit for human habitation, and also that such condition was allowed to continue despite requests to remedy it. In support of their action the plaintiffs relied in part upon section 1803 of the California Health and Safety Code, which required every person possessing any place infested with rodents, as soon as he knew of their presence, to proceed at once and continue in good faith to endeavor to exterminate them. One allegation of the complaint was that the above-mentioned condition commenced in June 1941 and was known to defendants at all times and that the plaintiffs were bitten in October 1941.

The trial court sustained the defendants' demurrer and dismissed the complaint, but the California District Court of Appeal took the view that the allegations of the complaint were sufficient to state causes of action based upon negligence and upon the maintenance of a nuisance. While, said the court, the complaint is based upon an

unusual set of facts and no authority directly in point has been called to our attention, "this is no valid objection provided the facts alleged bring the causes within recognized general principles of law." A prior case was quoted from to the effect that no person is permitted by law to use his property in such a manner that damage to his neighbor is a foreseeable result.

With respect to the defendants' contention that their duties toward plaintiffs began and ended with their duties as lessors of the portion of the premises in which plaintiffs resided and that the complaint failed to show a violation of defendants' duties as such lessors, the court stated that, as it viewed the complaint, the gist of plaintiffs' causes of action was an alleged violation by defendants of their duties as owners and possessors of the adjoining property rather than an alleged violation of defendants' duties as lessors.

Another claim of the defendants was that the plaintiffs and their parents assumed as a matter of law the risk of being bitten by rats inasmuch as they continued to occupy the premises from June to October. According to the court, it seemed certain that it could not be said as a matter of law from the plaintiffs' allegations that the plaintiffs, aged 2 and 3 years, respectively, assumed the risk involved here. If it could be said that the allegations showed that the parents assumed the risk, such assumption by them "should not be permitted to affect the rights of their minor children. * * * the assumption of risk by parents should not be held to preclude a recovery by a minor child on his own behalf."

The lower court's judgment was reversed with directions to overrule the defendants' demurrer.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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EXPERIMENTAL CHEMOTHERAPY OF BURNS AND SHOCK. IV. PRODUCTION OF TRAUMATIC SHOCK IN MICE. V. THERAPY WITH MOUSE SERUM AND SODIUM SALTS [1]

By SANFORD M. ROSENTHAL, *Principal Pharmacologist, United States Public Health Service*

IV. Production of Traumatic Shock in Mice

In previous studies (*1*) by exposure of mice to a standardized burn, a technique was developed whereby shock could be produced in a large number of animals in a short time. This permitted a degree of controlled experimentation not hitherto possible in this field, and when certain factors such as age, environmental temperature, and diet were kept uniform a satisfactory degree of reproducibility was obtained.

With this procedure the evaluation of local and systemic therapy on the mortality from shock was carried out. Of particular interest was the fact that more than 90 percent of animals could be saved from shock fatal to the controls by the administration of isotonic solutions of sodium salts in amounts equal to 10 to 15 percent of body weight.[2] That this was a sodium effect was shown in that all sodium salts behaved equally, that hypertonic solutions were less effective, that glucose solutions and water were ineffective, and that the curative action could be antagonized by potassium. Results with mouse blood serum and human serum albumin suggested that their effects could be correlated with their sodium content.

It was desired to test whether these findings would apply in traumatic shock. After trying several forms of trauma in mice, a technique was developed based upon the tourniquet method previously employed by other workers (*2, 3, 4, 5*). The changes which occur in the blood and circulation upon release of the tourniquet have been shown by these workers to be characteristic of the shock syndrome.

[1] From the Division of Chemotherapy, National Institute of Health.

[2] Among 708 burned mice treated within 5 hours with 2.2 to 3 cc. of 0.9 percent NaCl, the acute mortality was 6 percent as compared with 94 6 percent among 221 controls.

Allen (*3*) used this method in rats and reported some of the results which we subsequently found in burn shock and which are to be presented in this paper—the harmful effects of a hot and cold environment, the curative action of saline injections, the less beneficial effects of plasma. Detailed protocols were not given.

METHOD

With the aid of an assistant, the mouse is held ventral surface up, with the head in a test tube containing cotton saturated with ether. A stout thread (fishing line) is looped over the foot, and the free end, to which is fastened a small weight, is dropped through a thin-walled metal cylinder of a size that readily passes over the thigh. By traction on the thread with one hand the leg is pulled into the cylinder, which is pressed snugly against the body of the animal. With the thumb of the other hand a rubber band, which has been looped around the end of the cylinder, is pushed off, onto the thigh of the mouse. We have used a brass cork-boring tube of 1 cm. diameter, and No. 30 rubber bands (Eberhard Faber) which are approximately 11 cm. in circumference and 0.32 cm. in width. Previous dipping of the cylinder in water facilitates the ease with which the band may be pushed off.

The band was looped around the end of the cylinder six turns in all cases. The use of six turns gives a fairly wide and uniform constriction. The tension, as measured upon a thin-walled rubber tubing whose lumen was loosely filled with a glass rod, was over 425 mm. of mercury for all bands tested.

The bands were applied to both legs in all the following experiments, and it is convenient to have two cylinders wrapped with bands and two weighted threads at hand, so that only a few seconds of anesthesia are required to apply the tourniquets to both legs. Sixty mice can be treated in this manner within an hour.

No subsequent anesthesia is used; the numbing effects of the tourniquets are such that little evidence of pain is seen. Occasionally a mouse will chew upon its leg. If hemorrhage occurs upon release of the band, the animal is discarded. The bands are cut off at the desired time with fine scissors, as attempts to remove them intact require too much manipulation.

In all of the following experiments, for purposes of uniformity, female albino mice of 16 to 21 gm. were employed. The diet consisted of dog pellets (Ralston), and water was allowed at all times. They were kept in individual jars during the first few days of the experiments. The room temperature during the course of these experiments ranged from 24° to 30° C.

LENGTH OF APPLICATION OF THE TOURNIQUET AS RELATED TO THE MORTALITY FROM SHOCK

Other investigators have shown that shock does not develop until release of the tourniquet. In larger animals a 5- to 8-hour period has been used (*2*, *3*, *4*, *5*). This must necessarily be influenced by the width and tension of the tourniquet, the species of animal, and site of application.

A systematic study of the mortality following release of the bands after varying intervals of time revealed that with this technique the

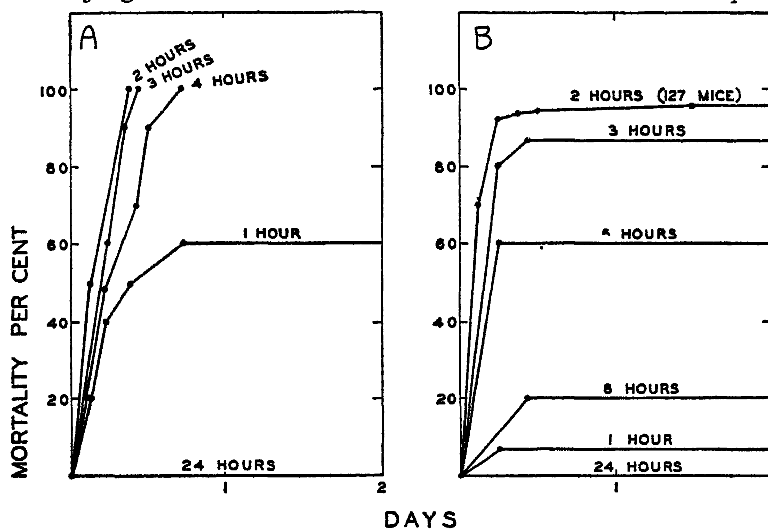

FIGURE 1.—The relation to mortality of length of application of the tourniquets. Experiment A represents 10 mice to each group while in B 15 each were used except at the 2-hour interval, which is a composite of several experiments with 127 mice.

maximum percentage of fatalities in mice occurred from an application of 2 to 3 hours (fig. 1). A striking feature of these experiments was the sharp reduction in mortality which occurred when the bands were applied longer than 5 hours. After 8 hours only 20 percent of the animals died during the shock period, while after 24 hours of application no evidence of shock was seen and no fatalities during the first two days occurred among 25 mice.

No difference in the degree of swelling could be observed between the 2- and 8-hour periods of application, although quantitative studies remain to be done. An inverse correlation was present between the mortality from shock and the degree of irreversible tissue damage. Where the mortality was highest (2-hour period) the swelling gradually subsided and after 1 to 3 weeks the appearance of the legs approached normal, except for some residual paralysis. After 8 hours of constriction the legs remained enormously swollen and gangrene developed in most instances. Application of the bands for 24 hours

resulted in limbs that were dry and necrotic. There was little tendency to swelling, hemorrhage, or infection, and after several days only the neat stumps of the thighs remained. The relation of these changes to shock can best be explained on the degree of occlusion of the small vessels, and the subsequent impairment of circulation through the damaged tissues.

V. Therapy With Mouse Serum and Sodium Salts

For purposes of evaluating the effects of therapy, application of the tourniquets for 2 hours was chosen as the time interval. Upon removal

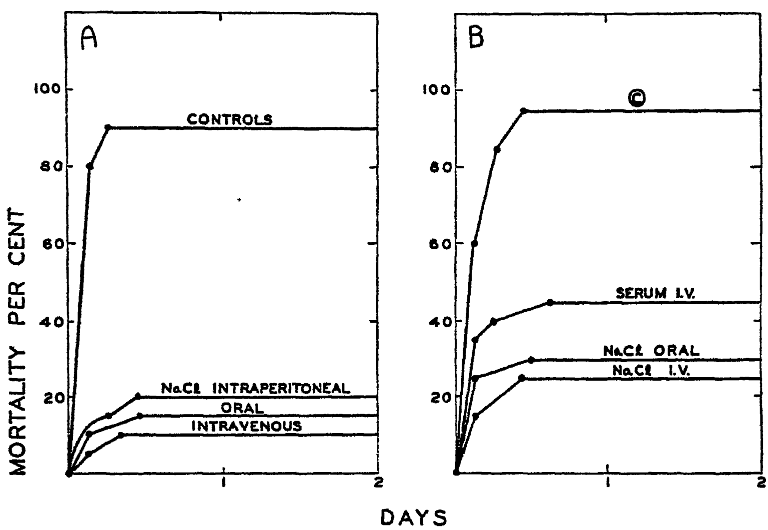

FIGURE 2–A. The curative action of 0.9 percent NaCl administered orally, intravenously, and intraperitoneally. Twenty mice to each group. *B.* Comparison of 0.9 percent saline orally and intravenously with mouse serum, intravenously. Twenty mice to each group. In all animals 0.8 cc. given on removal of the bands and repeated in 3 hours.

of the bands the development of shock is rapid. The average survival time in six groups of untreated mice was 3.2, 3.5, 3.35, 3.3, 5.4, and 4.8 hours. The mortality among 127 controls was 95.3 percent. Because the development of shock and death occurred earlier than in the burn experiments, therapy was administered shortly after removal of the bands and repeated in 3 hours. One to two minutes were taken for each intravenous injection.

Experiments carried out with 0.9 percent NaCl revealed an extent of curative action comparable to that obtained in burn shock (figs. 2 and 3). Of 80 mice receiving 0.8 cc. of saline orally on removal of the bands and 0.5 to 0.8 cc. 3 hours later, 13 died before the second dose of salt was administered; among the remaining 57, 47, or 85 percent, survived.[3] With 40 mice receiving saline intravenously, 4

[3] Similar results have been obtained with sodium lactate.

died before the second dose, while 34 of the remaining 36 (91 percent) survived. Similar effects were obtained by intraperitoneal injection. These results are not maximum, as the experiments were designed to compare routes of administration, and the quantity of saline was kept within limits that could be given intravenously with safety. The studies in burn shock demonstrated that the optimum curative effects are obtained with 2 to 3 cc. of saline per 20 gm. mouse, given over a period of 5 hours.

No difference in routes of administration was noted, as compared to burn shock, where oral and intraperitoneal therapy were superior to

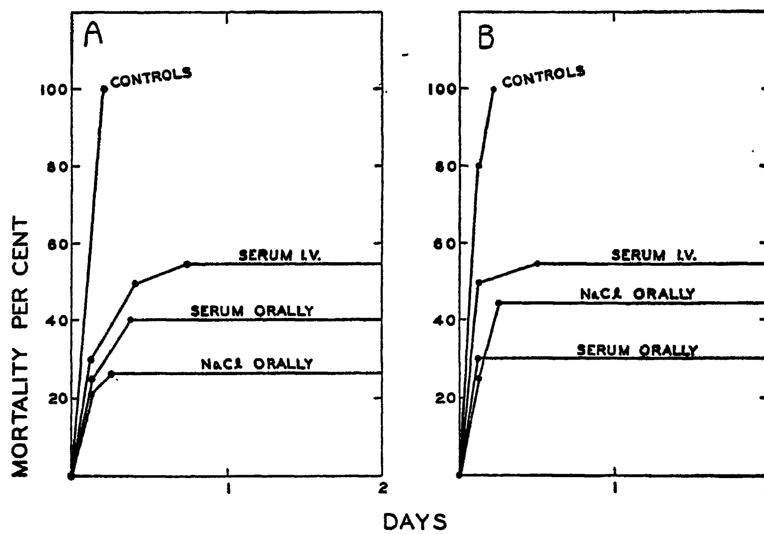

FIGURE 3.—Two experiments comparing mouse serum orally and intravenously and 0.9 percent NaCl orally. 0.8 cc. given on removal of the bands and 0.5 cc. 3 hours later. Each curve represents 20 mice.

intravenous. This may be due in part to the fact that in the burn experiments intravenous therapy was limited to 1 hour following the burn, because swelling of the tail made later injections difficult. However, no advantage of intravenous over oral therapy was observed in any case, and it is believed that the large quantities of solution required cannot be given intravenously without certain disadvantages and hazards.

SERUM ADMINISTRATION

Mouse serum rather than plasma was used in order to avoid the presence of anticoagulants. The serum was processed according to the method of Goodner (*6*) and each batch tested for toxicity in normal mice by two intravenous injections of 1 cc., 3 hours apart. No evidence of toxicity was seen.

As in burn shock, serum intravenously proved to be slightly less effective than equal quantities of 0.9 percent NaCl. Of 80 mice

receiving serum intravenously 26 died before the second injection, while 43 of the remaining 54 animals survived—80 percent as compared to 91 percent with saline.[4]

In the experiments on burn shock (*1*) it was suggested that the effectiveness of serum might be due to its sodium content. In order to establish that the protein content of the serum, as such, is not

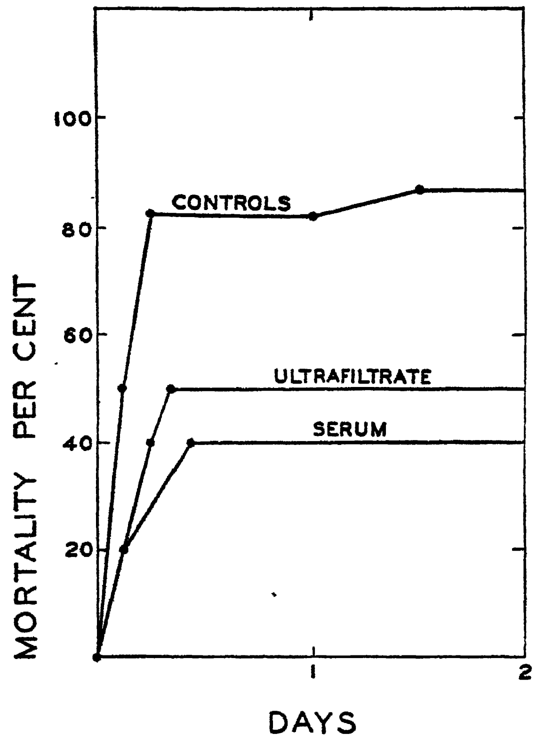

FIGURE 4.—Comparison of a protein-free ultrafiltrate of mouse serum with the original serum. Both given intravenously, 0.8 cc. on removal of the bands and 0.5 cc. 3 hours later. Twenty mice each in the treated groups, 22 controls.

effective in reducing the mortality from shock, a comparison was made between serum given orally and intravenously. It was demonstrated that serum was slightly more effective [4] when given orally than when given intravenously. Among 40 mice in each group the mortality with serum given orally was 35 percent as compared to 52 percent with intravenous injection, and 100 percent in the untreated controls (fig. 3).

Final evidence that the curative effects of serum are due to its electrolyte content was obtained by preparing a protein-free ultrafiltrate of serum and comparing it with the original serum. Blood from 350 mice was obtained and the serum processed as stated above.

[4] Statistical analysis of these differences reveals that a larger series of animals is required to establish their significance.

Half of this was ultrafiltered through collodion bags (*7*) under a pressure of 110 mm. of mercury. The ultrafiltrate was collected under sterile mineral oil, following which it was placed in boiling water for 5 minutes, cooled, and centrifuged. The clear, protein-free ultrafiltrate gave essentially the same reduction in mortality in traumatic shock as the original serum, compared by intravenous injection (fig. 4). Both the serum and ultrafiltrate were tested for toxicity in normal mice, as described above, and found to be tolerated without symptoms.

COMMENT

The experiments with traumatic shock are comparable to burn shock in that they indicate an electrolyte disturbance as a dominant factor in the mortality. As stated previously, the role of potassium (*8*) and the underlying mechanism of this disturbance remain to be established. Recent experimental studies have shown the lack of reliability of changes in blood pressure and hemoconcentration as an index of mortality from shock (*4, 5, 9, 10, 11*), and it is believed that current methods of treatment of shock are directed toward these secondary manifestations rather than to a more profound disturbance in the tissues. Because of the harmlessness of the procedure, the evidence presented would seem to warrant the clinical trial of isotonic solutions of sodium salts, in part or entirely by mouth, in amounts of at least 10 percent of body weight during the first 24 hours of traumatic or burn shock.[5] Because of the simplicity of administration it would seem suited to the emergency treatment of war casualties, where it is often necessary to wait several hours for the intravenous administration of plasma.

SUMMARY

A simplified procedure is described for the production of traumatic shock in mice under uniform conditions by the tourniquet method.

With this technique the maximum mortality results from 2 to 3 hours of application. Among 127 mice the mortality was 95.3 percent from 2 hours of application.

When the tourniquet is applied for longer than 5 hours a sharp reduction in mortality occurs; with 8 hours only 20 percent of the mice died, and when the bands remained on for 24 hours no deaths from shock occurred.

Isotonic solutions of sodium chloride or other sodium salts are highly effective in reducing the mortality from traumatic shock, whether given orally, intraperitoneally, or intravenously.

[5] Dr. Charles L. Fox, Jr., of the College of Physicians and Surgeons, New York, has treated 35 burned patients at Harlem Hospital with isotonic sodium lactate orally in amounts up to 11 liters in the first 24 hours. He reports that this solution is palatable and well tolerated. No plasma was used. Twenty of the cases had third degree burns involving up to 40 percent of body surface, and no deaths have occurred in this series. (C. L. Fox, Jr., in press.)

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Mouse serum intravenously is slightly less active than equal quantities of saline.

Mouse serum by mouth is slightly more effective than mouse serum intravenously.

Final evidence that the effect of serum on mortality is due to its electrolyte content was obtained in that a protein-free ultrafiltrate of mouse serum was as active as the original serum in reducing the mortality from traumatic shock.

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NOTES ON THE PATHOLOGY OF EXPERIMENTAL TRINITROTOLUENE POISONING [1]

By R. D. LILLIE, *Senior Surgeon, United States Public Health Service*

In the course of experimental studies on trinitrotoluene poisoning by Smith and his coworkers (*1*), a considerable amount of experimental pathologic material was submitted to the writer for study. Cats, rabbits, guinea pigs, and rats were included.

The pathologic alterations found were essentially similar in the four species and agreed well with those reported in dogs by Voegtlin, Hooper, and Johnson (*2*).

[1] From the Division of Pathology, National Institute of Health.

In five cats dying in 4 to 9 days after the administration of four to six subcutaneous doses of 50 mg. per kg., the liver showed slight to moderate centrolobular fine fat droplet deposit in liver cells, some centrolobular congestion and atrophy of cell cords, and slight to marked Kupffer cell hemosiderosis. The spleen showed slight to marked myelosis and slight to moderate pulp hemosiderosis. Erythrophagia was infrequent in both liver and spleen. One cat showed many hemoglobin casts in the renal collecting tubules. The rest showed only the normal fairly marked fatty infiltration of the cortical convoluted tubules.

Cats carried 10 to 30 days on daily subcutaneous injections of 20 mg. trinitrotoluene per kg. of body weight again showed a fairly marked hemosiderosis of the spleen pulp reticuloendothelium, of the hepatic Kupffer cells, especially toward the centers of the lobules, and of many scattered phagocytes in the interalveolar septa of the lung. Splenic myelosis was absent or slight. Occasionally some hemosiderin was seen in the epithelium or lumina of the renal convoluted tubules. The administration of vitamin C subcutaneously and the oral administration of methionin or cystine had little evident effect on these findings. Cats given trinitrotoluene in their food and later by stomach tube for 21 to 30 days showed similar findings.

Rabbits given subcutaneous injections of 200 mg. per kg. every second day and surviving 17 to 57 days showed occasionally a slight to moderate centrolobular fatty degeneration of the liver. Pigmentation of Kupffer cells was not obvious by ordinary methods. The kidneys contained numerous hemoglobin casts in the collecting tubules in one rabbit, in another there was marked hemosiderosis of the cortical tubule epithelium. The rest showed no significant lesions. The spleen regularly showed a quite marked pulp hemosiderosis but little or no myelopoiesis. Vitamin C made little difference.

Guinea pigs on a low vitamin C diet, receiving trinitrotoluene orally at 200 mg. per kg. for 16 days and then 400 mg. per kg. daily, were given subcutaneously high and low vitamin C supplements. Animals dying in 30 to 40 days showed slight to marked centrolobular, fine to medium fat droplet deposit in liver cells and a moderate to marked Kupffer cell hemosiderosis. Hemoglobin casts were found in the renal collecting tubules in two guinea pigs. Slight to moderate fatty infiltration of the epithelium of the convoluted or loop tubules appeared in about half the animals, and there was often a slight to moderate hemosiderosis of the convoluted tubule epithelium. The spleen presented a moderate to marked pulp hemosiderosis and pulp myelosis.

Guinea pigs killed at 59 to 60 days, after 43 doses, showed little or no fatty changes in the renal epithelium, less fatty alteration of the liver cells, an essentially similar hemosiderosis of the hepatic Kupffer cells, the splenic pulp reticuloendothelium and the renal convoluted

tubule epithelium, and a similar grade of splenic myelosis. The amount of vitamin C given produced little evident difference between the two groups.

In rats fed 0.3 percent TNT in various low and high protein diets, there were variable, usually slight fatty changes in liver cells and a well marked hemosiderosis of the spleen. The fatty changes in the liver were sometimes midzonal, sometimes periportal or centrolobular and of the fine droplet type, and in many rats were absent. Splenic hemosiderosis was often of very marked grade, chiefly in pulp reticuloendothelial cells, but also in follicle phagocytes. The Kupffer cells in the liver also often contained hemosiderin, but iron positive phagocytes were rarely found in the lung tissue. The renal convoluted tubules rarely showed traces of iron-positive pigment in their epithelium, in contrast to the findings with certain other hemolytic poisons. Splenic myelosis was relatively slight for rats.

The various diets employed appeared to exert little influence on the hemosiderosis. As might be expected, cystine enrichment of a low protein diet produced coarse globule fatty infiltration and some ceroid in the liver (*3*), and similar fatty infiltration with or without ceroid appeared in rats on the low protein diet without TNT. Such control rats showed only small amounts of hemosiderin in the spleen.

The foregoing picture of a dominant general hemosiderosis and minor fatty degeneration of liver and perhaps kidney agrees with the methemoglobinemia seen in man (*4*). The subacute yellow atrophy grading into cirrhosis described in man (*5*) appears to have been infrequent and is not dissimilar to the lesion of the so-called epidemic hepatitis seen during the present war. In this study 1 of the 46 cats showed a marginally organizing infarct in the liver; 1 of 25 guinea pigs showed a widespread recent coagulation necrosis of the liver in which faded nuclei were still visible in the strongly oxyphil and markedly fatty liver cells, and 3 of 21 rabbits showed focal areas of midzonal or centrolobular coagulation necrosis of the liver. However, no definite necrosis was found in the livers of 82 rats.

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DEATHS DURING WEEK ENDED SEPTEMBER 11, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 11, 1943	Corresponding week, 1942
Data for 89 large cities of the United States:		
Total deaths	6,985	6,748
Average for 3 prior years	6,796	
Total deaths, first 36 weeks of year	305,119	278,612
Deaths under 1 year of age	571	503
Average for 3 prior years	496	
Deaths under 1 year of age, first 36 weeks of year	22,348	19,199
Data from industrial insurance companies:		
Policies in force	65,808,740	65,013,474
Number of death claims	7,980	8,019
Death claims per 1,000 policies in force, annual rate	6.3	6.4
Death claims per 1,000 policies, first 36 weeks of year, annual rate	9.8	9.3

PROVISIONAL MORTALITY RATES FOR THE FIRST QUARTER OF 1943

The mortality rates in this report are based upon preliminary data from 38 States, the District of Columbia, Alaska, Hawaii, and the Canal Zone. Comparative data for the first quarter of 1942 and 1941 are presented also for 35 States and the District of Columbia.

This report is made possible through a cooperative arrangement with the respective States, which furnish provisional quarterly tabulations of current births and deaths to the United States Public Health Service. Because of some lack of uniformity in the method of classifying deaths according to cause, as well as some delay in filing certificates, these data are preliminary and some deviation from the final figures may be expected, especially for specific causes of death for individual States. Nevertheless, it is believed that the trend in mortality within each State is reasonably accurate; in the past these preliminary reports have accurately reflected mortality trends. Comparison of specific causes of death for different States, however, is subject to error because of the factors mentioned above.

Population estimates for the different States used in computing rates were as follows: 1943—official United States Census Bureau estimates of the civilian population as of March 1, 1943, based on registration for War Ration Book Two; 1942—official United States Census Bureau estimates of the civilian population as of May 1, 1942, based on registration for War Ration Book One; 1941—average of the Census enumerated population as of April 1, 1940, and the estimated civilian population as of May 1, 1942. Although deaths in the armed forces in the continental United States are presumably included in these provisional data, it was not possible to include soldiers in the 1941–43 populations; in 1940 the number of soldiers was a negligible percentage of the total population. The number of deaths of soldiers within the continental United States is also relatively small.

The mortality rate from all causes during the first 3 months of 1943 was 11.7 per 1,000 population (annual basis), as compared with 10.9 and 11.8 for the corresponding periods in 1942 and 1941, respectively. The increase in the death rate was widespread; 24 of the 36 States for which data are available reported higher rates in 1943 than in 1942. The death rate from all causes among persons insured in the industrial department of the Metropolitan Life Insurance Co. for the first 3 months of the year was about 5 percent above the rate for the first 3 months of 1942.

The increase in the death rate resulted from some increase in all of the important causes of death except tuberculosis and accidents. For tuberculosis the rate for 1943 was lower than in either of the two preceding years. However, in 16 of the 36 States with available data. the rate for 1943 was higher than in 1942. The total accidental death rate stood at the level of the two preceding years, but deaths from automobile accidents declined almost 40 percent; the rate was lower than in 1942 in every one of the 36 States. In 29 of the 36 States the cancer death rate was higher than in 1942 and the death rate from heart diseases was higher in 27 of the 36 States in 1943 than in 1942. Twenty-five of the States contributed to the 7-percent increase in the cerebral hemorrhage death rate and 23 of the 36 States had higher pneumonia and diabetes rates in 1943 than in 1942. Whooping cough was the only one of the four common childhood diseases to have a higher rate in 1943 than in 1942.

During the latter part of 1942 the most severe epidemic of meningococcus meningitis included in this series of records started in States along the Atlantic coast and spread into all sections of the country, reaching its peak during April of the current year. The death rate for the first 3 months of 1943 was 2.3 per 100,000 population, as compared with rates of 0.7 and 0.6 for the corresponding periods in 1942 and 1941, respectively.

Both the infant and maternal mortality rates continued to decline; the decrease in the maternal mortality was widespread, 24 out of 34 States with available data reporting a lower rate in 1943 than in 1942.

An increase in the birth rate was reported by 32 of the 34 States with available data; the rate, 21.9 per 1,000 population, was more than 20 percent above that for 1942.

Provisional mortality from certain causes in the first 3 months of 1943, with comparative provisional data for the corresponding period in preceding years

State and period			Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																			
	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1–2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Tuberculosis, all forms (13–22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107–109)	Cancer, all forms (45–55)	Diabetes mellitus (61)	Intracranial lesions of vascular origin (83)	Diseases of the heart (90–95)	Nephritis, all forms (130–132)	All accidents, including automobile accidents (169–195)	Automobile accidents (170a, b, c)
36 States: [1]																								
1943	11.7	21.9	45	2.3	0.3	0.5	4.2	0.5	1.0	2.6	1.2	2.3	0.2	0.5	42.8	12.2	16.8	71	124	29.8	105	351	81	68	14.2
1942	10.9	18.0	50	2.9	.4	.8	3.6	.5	1.0	2.1	1.6	.7	.2	.4	44.2	12.3	16.4	69	121	28.3	98	323	79	68	23.1
1941	11.8	17.7	53	3.2	.5	(2)	3.5	.5	.9	3.0	1.6	.6	.3	.5	47.1	(2)	46.7	80	118	30.1	96	331	84	68	23.8
Industrial policyholders: [3]																								
1943	8.6	----	----	----	.1	----	[4] 3.0	.4	.8	1.4	.5	----	----	----	40.9	10.9	9.4	51	111	31.9	75	[5] 197	[6] 57	48	12.4
1942	8.2	----	----	----	.1	----	[4] 3.7	.6	.6	1.0	.6	----	----	----	43.9	10.9	7.7	42	107	31.6	67	[5] 180	[6] 58	50	20.8
1941	8.4	----	----	----	.5	----	[4] 3.3	.6	.7	1.5	.8	----	----	----	45.1	11.5	20.8	51	106	33.3	68	[5] 184	[6] 59	47	19.8
Alaska:																								
1943	14.0	13.8	116	(7)	(7)	(7)	(7)	(7)	(7)	16.0	63.9	(7)	(7)	(7)	231.8	16.0	8.0	88	56	16.0	16	168	24	224	8.0
1942	16.2	26.5	107	2.0	(7)	(7)	10.7	(7)	5.3	16.0	5.3	(7)	(7)	(7)	239.8	(7)	26.6	112	91	16.0	59	213	37	256	10.7
1941	21.0	29.2	132	7.2	5.4	(2)	(7)	(7)	(7)	21.7	162.6	(7)	5.4	(7)	498.5	(2)	113.8	146	81	5.4	81	206	43	146	(7)
California:																								
1943	13.0	22.7	37	2.0	.1	.8	5.0	.2	1.8	1.7	.4	3.7	.5	.7	53.8	17.4	8.4	83	149	29.5	100	524	67	101	33.2
Canal Zone:																								
1943	10.5	20.8	49	3.8	(7)	(7)	7.8	(7)	(7)	(7)	(7)	(7)	(7)	(7)	62.6	7.8	(7)	23.5	39	23.5	63	78	39	344	31.3
Colorado:																								
1943	12.6	22.6	49	2.4	(7)	(7)	3.1	1.1	1.9	1.1	3.8	6.5	(7)	.8	53.3	9.6	25.7	120	134	19.2	96	325	81	86	13.4
1942	13.1	20.0	62	2.8	.7	(7)	.4	1.5	1.5	4.5	1.9	.4	.7	.4	61.8	12.3	13.0	123	132	22.0	113	298	91	108	36.1
1941	11.8	18.1	58	3.7	1.5	(2)	5.1	.7	.4	4.4	1.1	1.1	1.5	(7)	59.8	(2)	51.0	96	111	13.9	87	309	91	69	24.9
Connecticut:																								
1943	10.3	16.7	34	1.4	(7)	(7)	2.1	.2	(7)	.9	.2	1.6	(7)	.7	27.3	5.3	3.9	47	138	33.1	96	370	55	57	13.6
1942	9.5	14.6	32	3.0	(7)	(7)	3.0	(7)	(7)	.2	.2	.5	(7)	(7)	33.8	6.9	3.0	31	123	34.0	86	328	65	52	15.6
1941	10.1	11.5	41	4.3	.5	(2)	2.1	.5	(7)	.2	.2	.5	.2	(7)	31.0	(2)	14.2	50	133	40.1	90	364	79	52	15.2

See footnotes at end of table.

Provisional mortality from certain causes in the first 3 months of 1943, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid and paratyphoid fever (1-2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Tuberculosis, all forms (13-22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107-109)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Intracranial lesions of vascular origin (83)	Diseases of the heart (90-95)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170a, b, c)
Delaware:																									
1943	14.7	20.7	48	4.3	(7)	(7)	4.5	(7)	(7)	9.0	(7)	14.9	(7)	(7)	52.2	17.9	17.9	121	140	41.8	130	493	160	67	19.4
1942	12.9	18.5	38	(7)	(7)	(7)	4.4	2.9	.4	(7)	(7)	(7)	(7)	(7)	57.4	5.9	11.8	94	118	20.6	134	451	124	65	17.7
1941	14.1	19.2	49	(7)	(7)	(2)	4.5	3.0	(7)	7.5	1.5	(7)	(7)	(7)	58.4	(2)	35.9	102	115	22.4	126	442	162	61	23.9
District of Columbia:																									
1943	12.4	28.8	38	1.8	(7)	(7)	5.8	1.0	(7)	4.4	1.0	3.4	(7)	(7)	59.0	16.0	8.7	90	145	33.4	69	365	109	58	10.6
1942	11.4	25.0	41	2.2	(7)	(7)	10.4	(7)	(7)	4.9	(7)	1.5	(7)	(7)	50.7	22.2	6.4	84	128	26.2	80	312	104	69	21.2
1941	12.9	23.7	46	3.7	.5	(2)	7.1	(7)	1.1	1.6	.5	1.6	.5	(7)	59.0	(2)	12.6	117	151	29.5	85	338	105	71	21.9
Florida:																									
1943	12.5	20.4	52	3.6	.4	1.2	7.9	.4	2.2	3.2	.8	3.5	.4	.6	38.6	22.3	32.9	66	106	23.1	117	309	90	119	24.1
1942	13.1	19.9	59	3.7	2.1	2.5	7.5	.2	2.7	1.7	5.4	1.3	(7)	.2	48.7	18.4	27.6	76	102	23.6	130	336	78	101	36.6
1941	15.1	18.6	57	5.3	1.3	(2)	5.5	(7)	1.1	2.1	.2	1.3	1.9	.6	52.4	(2)	78.2	78	104	30.4	151	402	108	148	47.1
Georgia:																									
1943	8.7	22.7	50	3.3	.1	.7	4.2	.3	1.6	5.8	.4	1.9	(7)	.4	35.5	11.7	28.8	68	60	13.3	86	171	93	54	12.9
1942	9.1	19.8	67	3.2	.3	1.2	2.9	.1	1.6	2.0	4.6	.5	.3	.1	37.1	13.5	30.2	78	58	12.6	92	163	96	60	21.8
1941	10.7	19.1	71	3.2	.5	(2)	3.5	.4	1.4	3.9	2.9	.5	.7	(7)	41.7	(2)	93.7	80	59	15.9	100	205	100	66	27.8
Hawaii:																									
1943	7.7	25.0	48	1.1	(7)	.9	13.8	(7)	.9	.9	(7)	1.8	(7)	(7)	56.0	14.7	3.7	38	76	17.4	47	133	51	102	15.6
1942	7.2	23.5	43	1.2	2.8	(7)	6.5	(7)	(7)	5.6	(7)	.9	(7)	(7)	41.8	7.4	4.6	61	78	13.0	33	144	67	53	19.5
1941	7.5	22.0	55	1.7	.9	(2)	10.4	(7)	(7)	1.9	3.8	(7)	.9	.9	53.8	(2)	3.8	56	88	12.3	55	136	59	57	16.0
Idaho:																									
1943	10.3	26.5	36	2.6	.9	.9	(7)	.9	1.7	(7)	6.1	1.7	(7)	.9	20.8	4.3	19.1	59	111	18.2	90	307	77	77	15.6
1942	10.3	23.5	41	1.4	.9	(7)	(7)	(7)	.9	.9	.9	(7)	(7)	.9	18.7	2.2	14.5	60	77	19.6	109	301	66	84	19.6
1941	9.2	23.5	43	1.4	.8	(2)	1.6	(7)	(7)	6.5	(7)	1.6	(7)	2.4	8.1	(2)	30.0	50	89	21.9	87	239	62	78	19.4
Illinois:																									
1943	12.4	19.2	38	2.1	.2	.3	3.1	.5	1.1	1.5	.4	1.3	.1	.6	43.7	12.1	8.5	56	155	34.3	102	440	97	63	15.2
1942	11.7	16.7	37	2.3	.2	.6	1.1	.6	1.0	1.2	.6	.2	.2	.1	41.4	12.6	8.7	54	150	35.9	97	392	97	68	24.6
1941	11.8	14.6	41	2.8	.3	(2)	1.7	.8	.7	1.2	1.4	.2	.1	.3	46.5	(2)	16.6	67	146	34.2	86	384	100	65	24.9

Indiana:																									
1943	12.9	22.2	45	2.5	.2	.1	5.1	.7	.6	3.6	3.6	1.3	.2	.2	35.4	9.4	27.4	91	124	18.3	151	302	99	67	16.4
1942	11.5	18.2	38	3.7	.2	.2	2.3	.5	.7	1.2	.2	(7)	.3	.6	40.4	10.5	29.1	73	123	12.5	144	282	82	73	30.5
1941	12.4	16.7	48	2.9	.5	(2)	1.6	.7	1.9	2.0	.9	.7	.2	.1	38.9	(2)	54.0	87	123	15.9	146	311	73	83	36.2
Iowa:																									
1943	11.6	19.5	40	1.4	.2	.2	1.1	1.6	.5	.9	.9	1.2	(7)	(7)	15.6	7.8	15.6	58	143	31.8	138	362	71	70	11.5
1942	10.4	19.7	35	2.8	(7)	.2	2.2	.2	.2	1.5	1.3	(7)	.2	.5	14.6	6.3	14.4	54	142	25.2	119	310	61	66	18.1
1941	10.9	18.4	39	3.1	.3	(2)	1.1	.5	.3	1.1	.8	.3	(7)	.2	14.3	(2)	35.8	78	134	30.9	114	323	66	55	18.1
Kansas:																									
1943	12.9	21.2	41	1.7	(7)	.2	1.7	1.9	.7	2.1	.5	1.9	.5	1.9	26.8	10.5	29.2	65	139	36.8	140	386	99	90	15.9
1942	11.8	19.1	38	2.0	(7)	(7)	3.1	.9	(7)	.5	1.4	.2	.2	1.4	25.7	10.9	31.4	53	134	33.0	134	345	101	76	22.7
1941	12.3	17.0	47	2.7	(7)	(2)	2.5	.2	.4	4.8	2.5	1.4	(7)	1.2	26.3	(2)	60.2	69	123	31.8	114	341	119	73	27.7
Kentucky:																									
1943	10.8	(2)	(2)	(2)	.6	.6	5.2	.3	1.1	4.6	6.4	3.1	.5	.6	64.0	11.3	31.6	101	87	15.4	108	273	84	59	10.7
1942	10.8	18.4	69	3.8	.9	1.6	3.5	1.5	2.7	5.2	1.5	1.3	.6	.1	64.4	9.3	32.6	96	84	15.6	100	260	87	79	17.4
1941	12.0	18.3	71	5.2	1.0	(7)	3.6	1.2	1.0	9.9	6.2	1.9	1.0	.1	77.5	(2)	119.1	107	84	21.7	114	248	85	66	23.0
Louisiana:																									
1943	10.7	24.3	50	3.4	1.0	1.0	5.9	(7)	.5	3.8	1.0	1.4	.2	.2	57.8	19.0	23.0	75	90	18.6	81	275	79	56	13.1
1942	10.2	21.1	58	3.2	1.3	.8	6.7	(7)	2.7	1.8	1.5	1.2	.3	.5	49.3	23.2	25.9	71	89	18.2	72	258	79	59	18.4
1941	11.6	21.9	69	3.7	2.9	(2)	6.4	.5	1.9	2.7	.2	1.0	.5	(7)	62.5	(2)	77.4	94	85	20.0	78	291	94	65	21.7
Maine:																									
1943	15.6	24.0	63	1.5	(7)	(7)	7.2	.5	(7)	5.6	.5	11.8	1.0	(7)	31.8	12.3	27.2	109	165	30.2	161	500	125	86	14.3
1942	13.7	20.0	46	1.9	.5	(7)	6.4	1.0	(7)	1.0	3.9	1.5	(7)	.9	30.1	8.5	19.2	67	155	37.5	146	400	89	69	22.7
1941	14.8	17.2	62	2.3	1.0	(2)	4.9	.5	(7)	2.4	.5	.9	.5	.9	35.5	(2)	61.2	104	163	40.8	136	411	118	75	22.3
Maryland:																									
1943	13.3	23.7	44	1.2	.6	(7)	7.4	(7)	.8	2.7	.6	6.8	(7)	.4	67.5	16.1	8.0	94	135	34.5	109	412	134	75	16.7
1942	12.7	18.6	50	2.2	.2	(7)	4.5	.4	.4	.6	1.3	2.8	(7)	.6	72.8	19.0	8.8	91	137	33.0	106	384	128	73	28.7
1941	13.5	17.8	54	1.8	.4	(2)	5.9	.2	(7)	5.2	(7)	1.3	.2	(7)	77.5	(2)	27.3	97	147	38.2	104	406	135	81	28.6
Michigan:																									
1943	11.6	23.3	45	2.3	.2	.2	5.5	.2	.4	1.8	.2	1.7	.2	.2	36 1	10.6	12.3	80	128	32.3	105	371	61	58	14.8
1942	10.0	20.1	42	2.3	.1	.5	2.9	1.1	.3	1.1	.1	.3	.1	.3	34.9	11.1	6.2	61	113	27.5	95	308	52	62	25.8
1941	10.8	17.3	46	3.3	(2)	(7)	3.2	1.1	.2	1.6	2.9	.2	.1	.2	36.1	(2)	23.2	68	119	30.0	95	329	59	69	30.7
Minnesota:																									
1943	11.1	23.5	34	1.8	(7)	(2)	1.6	.5	1.0	1.4	.3	.5	(7)	.8	27.3	(2)	9.9	67	152	30.8	109	336	49	56	7.2
1942	9.8	20.1	31	1.1	.2	.3	4.2	.2	.3	.5	.8	.3	.3	.2	24.1	8.6	8.4	55	141	25.0	102	293	42	62	19.9
1941	10.5	19.2	41	2.5	.5	(2)	2.5	.4	.6	.4	.1	.4	(7)	.6	30.9	(2)	25.1	75	147	28.8	88	295	44	65	12.9
Montana:																									
1943	12.4	24.0	50	1.1	.9	2.6	3.4	1.7	1.7	3.4	2.6	(7)	(7)	(7)	47.2	8.6	7.7	72	115	22.3	100	325	63	158	16.3
1942	10.7	19.9	49	3.1	(7)	(7)	2.3	.8	2.3	2.3	(7)	.8	(7)	.8	41.2	14.8	9.3	58	112	10.9	109	295	64	73	23.3
1941	11.1	20.7	46	2.2	.8	(2)	2.3	1.5	3.6	(7)	(7)	(7)	1.5	(7)	50.3	(2)	51.8	70	104	15.0	104	263	58	85	30.8
Nebraska:																									
1943	11.9	20.6	44	1.5	(7)	(7)	2.0	1.4	1.0	1.0	4.4	1.7	(7)	.3	18.3	7.8	23.7	66	140	38.9	108	357	90	56	10.2
1942	10.0	17.8	37	2.2	(7)	.3	1.0	.3	.7	1.0	.3	.3	.3	.7	13.1	9.7	18.6	42	136	29.7	96	291	69	58	14.7
1941	11.0	17.1	44	2.8	.3	(2)	1.0	(7)	(7)	1.9	(7)	1.0	1.0	.3	17.1	(2)	70.1	69	134	27.9	129	260	75	52	15.2
Nevada:																									
1943	13.8	22.5	62	2.7	(7)	(7)	(7)	(7)	(7)	6.1	(7)	3.0	(7)	(7)	60.9	27.4	6.1	149	95	15.2	58	335	58	162	36.6
1942	14.8	17.1	48	(7)	(7)	(7)	(7)	(7)	(7)	9.5	(7)	(7)	(7)	3.2	72.8	9.5	9.5	44	127	12.7	101	389	67	291	88.6
1941	12.8	16.3	44	4.2	6.8	(2)	(7)	(7)	(7)	3.4	(7)	(7)	(7)	(7)	47.6	(2)	20.4	61	119	13.6	61	299	54	160	74.8

See footnotes at end of table.

Provisional mortality from certain causes in the first 3 months of 1943, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																				
			Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1–2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Tuberculosis, all forms (13–22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107–109)	Cancer, all forms (45–55)	Diabetes mellitus (61)	Intracranial lesions of vascular origin (83)	Diseases of the heart (90–95)	Nephritis, all forms (130–132)	All accidents, including automobile accidents (169–195)	Automobile accidents (170a, b, c)
New Jersey:																									
1943	12.8	21.1	36	1.8	.1	.2	4.4	.5	.5	.9	.9	4.4	.1	.6	45.3	11.3	6.6	65	146	39.8	115	469	81	64	17.4
1942	12.3	17.6	34	1.9	.1	.3	(2)	.3	(7)	.4	.1	.3	.1	.6	45.5	9.0	6.0	66	156	42.4	104	431	79	70	25.0
1941	12.2	14.4	40	2.2	.1	(2)	2.3	.2	.1	.8	1.0	.3	.1	.3	46.2	(2)	14.9	74	147	41.2	109	411	90	60	21.7
New Mexico:																									
1943	12.5	31.6	83	6.0	1.7	3.3	20.7	(7)	1.7	6.6	10.8	.8	.8	(7)	86.9	13.2	22.3	98	95	17.4	47	148	46	161	29.0
1942	11.0	27.0	102	1.7	.8	4.7	11.7	(7)	2.3	14.0	11.7	.8	(7)	.8	65.4	13.2	30.4	115	50	7.8	40	159	56	73	34.3
1941	11.5	27.7	90	3.1	3.1	(2)	9.2	(7)	3.1	12.3	18.5	(7)	(7)	(7)	74.0	(2)	43.9	90	62	13.1	30	140	53	89	40.8
New York:																									
1943	13.5	20.7	35	1.8	.1	.3	3.6	.3	.3	1.6	.9	3.1	.0	1.0	49.2	16.0	5.3	67	175	47.4	92	510	71	65	12.3
1942	12.3	17.2	34	2.2	.1	.1	3.1	.2	.2	.9	.1	.8	.1	.9	50.4	15.8	3.3	57	178	45.1	83	455	67	63	17.0
1941	12.8	15.1	38	2.1	.1	(2)	2.9	.5	.0	.9	.6	.6	.0	1.4	50.1	(2)	11.2	73	163	48.1	84	469	73	58	15.2
North Carolina:																									
1943	9.1	28.3	48	3.3	.1	1.0	4.8	.2	1.9	2.5	.5	1.8	.1	.1	42.9	7.6	18.5	74	65	13.6	101	189	82	62	18.6
1942	9.3	25.0	63	3.8	.4	.8	5.6	.6	1.2	5.3	3.8	.7	.1	.1	49.5	8.2	17.9	85	60	14.7	92	184	89	72	30.9
1941	10.5	23.5	72	4.8	.6	(2)	3.9	.3	2.8	5.8	2.0	.3	.3	.2	52.0	(2)	78.0	104	61	15.7	89	174	95	76	35.2
North Dakota:																									
1943	8.1	25.9	31	2.0	1.5	(7)	2.2	(7)	.7	(7)	.7	1.5	.7	1.5	23.5	5.1	8.8	41	94	22.0	87	239	53	39	4.4
1942	8.5	17.6	43	3.1	.7	.7	6.2	.7	(7)	2.1	2.1	(7)	(7)	1.4	22.6	2.1	6.2	28	82	18.5	77	169	34	27	8.9
1941	8.3	23.4	46	2.2	(7)	(2)	4.6	.7	2.6	1.3	1.3	(7)	.7	.7	24.3	(2)	21.7	45	88	18.4	73	219	41	51	13.1
Ohio:																									
1943	12.3	19.7	45	2.0	.1	.4	3.2	.5	.9	2.1	.5	1.3	.1	.4	39.3	14.4	18.2	71	139	36.7	126	377	77	76	17.3
1942	12.0	17.6	44	2.3	.2	.1	2.8	.4	.5	2.8	.8	.1	.1	.1	39.8	12.9	16.8	75	136	37.3	113	361	85	83	31.4
1941	12.3	14.7	46	2.5	.2	(2)	3.6	.4	.4	2.9	1.2	.4	.3	.7	42.8	(2)	40.3	73	134	34.7	112	355	80	86	30.7
Oklahoma:																									
1943	9.5	18.3	58	2.7	1.0	1.2	3.1	.2	2.3	3.5	.2	3.9	(7)	.4	41.5	9.8	25.1	71	88	18.7	100	208	58	65	12.7
1942	12.9	28.9	44	3.6	.7	1.1	2.2	.6	3.9	3.2	12.7	.9	1.1	.9	60.9	8.8	30.3	92	118	23.5	115	273	77	91	24.8
1941	10.	21.2	58	3.6	.4	(2)	2.0	.5	3.8	5.0	.4	.4	.2	.4	49.7	(2)	73.6	104	84	20.7	90	216	63	61	23.6

Pennsylvania:																									
1943	12.7	22.2	40	1.8	.4	.2	3.6	.4	.2	2.6	1.1	2.0	.3	.0	41.1	12.8	13.9	70	130	41.1	106	417	97	53	12.5
1942	12.3	20.9	39	2.0	.3	.1	3.8	.5	.3	1.8	1.0	.3	.2	.0	40.9	11.0	11.6	61	131	37.7	98	398	98	47	18.1
1941	12.7	19.0	40	2.3	.2	(2)	3.8	.5	.4	1.8	1.0	.3	.2	.5	43.5	(2)	30.7	76	124	41.4	96	416	106	56	15.9
Rhode Island:																									
1943	14.6	22.4	52	1.8	(7)	(7)	8.1	(7)	.6	2.3	(7)	15.1	.6	1.7	33.1	8.1	8.7	106	167	53.4	110	505	129	73	12.8
1942	11.8	17.9	45	1.9	(7)	(7)	9.6	(7)	.6	.6	(6)	.6	(7)	.6	41.6	8.4	5.1	69	135	39.9	118	394	97	57	16.3
1941	13.4	14.9	42	1.9	(7)	(2)	2.8	.6	(7)	.6	(7)	.6	(7)	1.1	46.4	(2)	19.2	92	166	49.8	104	462	126	45	11.3
South Carolina:																									
1943	8.4	22.9	58	4.2	.4	.9	2.9	.2	1.3	2.0	.2	2.9	.9	.2	37.1	13.3	25.0	75	50	11.5	92	157	92	58	7.3
1942	10.9	22.8	83	6.5	.9	1.1	4.9	(7)	3.2	5.3	4.5	1.1	.2	(7)	42.3	14.3	37.0	101	60	14.8	110	213	115	76	30.2
1941	11.7	20.8	99	6.2	1.3	(2)	1.1	.9	.6	9.2	2.6	1.7	.2	(7)	44.7	(2)	98.9	115	49	16.7	92	224	94	73	29.5
South Dakota:																									
1943	10.9	28.4	34	.8	(7)	.7	2.2	1.5	2.9	2.9	9.5	.7	(7)	.7	35.2	5.1	14.7	70	109	24.2	106	272	59	84	10.3
1942	9.7	20.8	41	1.7	1.4	(7)	2.1	(7)	6.2	7.6	(7)	2.8	(7)	(7)	26.2	5.5	10.4	69	113	16.6	99	243	65	62	21.4
1941	9.9	20.0	51	.7	(7)	(2)	.7	.7	1.3	4.0	.7	(7)	(7)	1.3	32.3	(2)	37.6	73	98	25.7	88	245	57	47	13.2
Tennessee:																									
1943	9.4	22.4	45	3.7	.3	.4	2.3	.3	1.3	4.5	1.7	2.1	.1	.4	68.3	12.6	81.3	72	78	12.2	94	186	62	62	13.5
1942	9.8	17.5	64	3.6	.4	.4	1.7	.8	.7	2.2	1.9	.6	1.0	.4	72.1	12.9	32.4	89	74	16.3	87	194	64	66	19.2
1941	10.8	16.0	75	3.6	.7	(2)	3.9	.3	1.0	6.7	3.2	1.8	.3	.8	83.3	(2)	93.7	110	77	15.6	81	183	71	55	17.4
Texas:																									
1943	10.0	(2)	(2)	(2)	.8	2.0	10.1	.4	3.2	5.0	.8	1.6	.5	.3	51.6	13.6	22.2	61	87	15.5	83	245	70	84	18.2
1942	9.6	(2)	(2)	(2)	.9	(2)	6.9	.4	2.9	2.6	3.1	.9	.6	.3	58.1	(2)	30.4	69	80	15.8	71	216	67	75	23.9
1941	10.7	(2)	(2)	(2)	1.3	(2)	8.0	.1	2.0	3.5	2.0	.6	.5	.4	62.7	(2)	87.0	82	80	16.0	67	220	73	70	27.6
Utah:																									
1943	9.8	29.0	37	.7	(7)	(7)	3.5	(7)	(7)	1.4	4.9	3.5	.7	(7)	7.6	4.9	14.6	64	99	19.4	64	303	72	74	16.7
1942	9.0	27.2	36	1.3	.7	(7)	2.9	.7	(7)	(7)	1.5	(7)	(7)	.7	13.9	7.3	15.4	36	94	13.9	58	303	63	68	26.4
1941	8.7	22.9	38	.3	(7)	(2)	6.6	(7)	(7)	1.5	(7)	(7)	(7)	(7)	13.2	(2)	22.8	42	68	22.0	58	290	53	61	23.5
Vermont:																									
1943	14.8	20.3	56	2.5	(7)	(7)	5.0	(7)	(7)	5.0	10.1	1.3	(7)	(7)	44.1	5.0	27.7	97	164	31.5	145	450	78	44	6.3
1942	12.7	19.1	41	3.7	(7)	1.2	4.7	1.2	1.2	2.4	(7)	1.2	(7)	(7)	36.5	5.9	11.8	54	141	30.6	123	382	88	52	15.3
1941	13.2	18.0	51	4.5	(7)	(2)	6.9	(7)	(7)	(7)	(7)	2.3	(7)	(7)	50.7	(2)	45.0	82	159	32.3	141	445	108	62	11.5
Virginia:																									
1943	10.8	22.3	58	3.2	.4	.7	2.2	.7	1.5	3.8	.7	6.3	(7)	.7	53.8	15.5	21.1	88	81	20.7	115	258	85	69	17.3
1942	11.2	19.4	70	3.7	.4	.9	3.9	.6	1.7	4.4	1.5	2.3	.1	.6	57.8	18.3	21.6	93	80	19.9	113	269	93	77	28.2
1941	13.0	18.6	87	4.0	.7	(2)	3.4	.3	1.3	9.8	6.5	1.0	.3	(7)	65.7	(2)	84.5	105	83	21.2	116	297	112	86	30.3
Wisconsin:																									
1943	11.4	21.3	41	2.4	.3	.4	2.3	.8	.5	.8	.5	1.0	(7)	.8	25.4	5.9	11.9	61	147	33.8	117	362	67	60	9.6
1942	9.8	17.6	35	2.0	.1	(7)	2.6	1.2	.3	.8	.5	(7)	(7)	.5	24.7	5.2	7.7	49	131	30.3	98	311	56	55	19.7
1941	10.3	16.8	44	2.3	.3	(2)	1.4	1.3	.1	1.2	.9	.1	.3	.9	24.8	(2)	26.0	61	135	29.8	97	314	58	56	18.9
Wyoming:																									
1943	9.5	21.7	47	2.5	(7)	(7)	(7)	(7)	(7)	1.8	5.3	1.8	1.8	5.3	5.3	15.9	21.3	71	82	15.9	57	262	92	92	17.7
1942	9.1	20.7	48	4.2	(7)	(7)	1.7	1.7	(7)	(7)	1.7	1.7	(7)	(7)	15.7	12.2	19.2	54	79	15.7	74	259	70	87	24.5
1941	9.4	17.7	62	4.7	(7)	(2)	1.7	(7)	6.7	(7)	3.4	1.7	(7)	3.4	16.8	(2)	57.1	61	72	16.5	82	230	87	74	31.9

[1] Estimated population March 1, 1943, 95,937,937. Includes all of the States listed below except California, New Jersey and Rhode Island. The District of Columbia is included as a State.
[2] Data not available.
[3] These data are taken from the April 1943 Statistical Bulletin published by the Metropolitan Life Insurance Co. The rates for 1943 are subject to correction as they are based on provisional estimates of lives exposed to risk. Data do not include all diseases reported to the Public Health Service.
[4] Classified as diarrhea and enteritis, age not specified.
[5] International List (1940) titles 92, 93 c, d, e, and 95 only.
[6] Chronic nephritis only.
[7] No deaths reported.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 18, 1943

Summary

Following a decline during the preceding week from 956 to 906 cases, the incidence of poliomyelitis increased to 1,020 cases during the current week. This is the largest weekly total since the week ended August 21, 1935, when 1,088 cases were reported. The total reported for that entire year was 10,732 cases. A total of 7,812 cases has been reported to date this year. The following States reported 18 or more cases currently (last week's figures in parentheses): *Increases* (and contributing most to the current rise)—Massachusetts 35 (23), Rhode Island 20 (10), Connecticut 32 (25), Pennsylvania 18 (8), Illinois 208 (189), Wisconsin 18 (14), Iowa 29 (23), Kansas 77 (47), Texas 57 (50), Utah 41 (40), Washington 27 (7), and California 150 (111); *decreases*—New York 65 (68), Michigan 29 (34), and Oklahoma 26 (36); *no change*—Ohio 20 and Colorado 35.

The incidence of meningococcus meningitis declined during the week from 173 to 135 cases, as compared with 30 for the 5-year (1938–42) median. The largest number of cases was reported in New York (12 cases, as compared with 23 last week). The cumulative total to date is 14,153, as compared with 2,584 for the same period last year and a 5-year median of 1,544.

Of the seven other common communicable diseases included in the following table, the current incidence of only influenza, measles, and scarlet fever and the accumulated totals for the first 37 weeks of the year for only measles and whooping cough are above the corresponding 5-year medians.

A total of 525 cases of infectious encephalitis has been reported to date this year as compared with 402 for the same period last year. States reporting the largest numbers this year are as follows: California 131, Texas 60, New York 55, Illinois 46, Kansas 25, and Massachusetts 24.

Deaths recorded for the week in 90 large cities of the United States aggregated 7,927, as compared with 7,558 for the preceding week and a 3-year (1940–42) average of 7,628. The accumulated total for these cities for the first 37 weeks of the year is 338,980, as compared with 311,115 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended September 18, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42	Week ended—		Median 1938–42
	Sept. 18, 1943	Sept. 19, 1942		Sept. 18, 1943	Sept. 19, 1942		Sept. 18, 1943	Sept. 19, 1942		Sept. 18, 1943	Sept. 19, 1942	
NEW ENGLAND												
Maine	0	0	0	------	------	------	5	3	7	3	5	0
New Hampshire	0	0	0	------	------	------	0	0	2	0	0	0
Vermont	1	0	0	------	------	------	1	30	2	0	0	0
Massachusetts	2	2	2	------	------	------	31	28	28	10	1	1
Rhode Island	0	1	0	------	------	------	17	3	3	8	0	0
Connecticut	1	0	0	5	------	1	9	5	5	8	0	0
MIDDLE ATLANTIC												
New York	7	3	8	------	[1] 3	[1] 4	70	32	60	12	8	7
New Jersey	1	5	3	4	5	4	86	21	21	5	2	0
Pennsylvania	4	5	12	------	------	------	12	26	33	10	3	3
EAST NORTH CENTRAL												
Ohio	5	3	10	1	18	7	40	12	13	5	3	0
Indiana	3	4	4	4	18	6	10	3	2	1	1	0
Illinois	8	13	17	6	4	4	15	20	20	8	0	1
Michigan [2]	4	3	3	2	15	2	151	11	44	9	1	1
Wisconsin	0	1	0	17	16	16	75	40	44	0	0	0
WEST NORTH CENTRAL												
Minnesota	8	1	1	------	------	1	17	5	5	0	0	0
Iowa	7	30	2	1	------	3	0	4	7	5	0	0
Missouri	1	6	6	------	------	------	1	2	3	2	0	0
North Dakota	2	0	1	------	3	2	14	0	0	0	0	0
South Dakota	2	1	3	------	------	------	0	2	1	0	0	0
Nebraska	6	5	1	------	4	------	1	26	2	0	0	0
Kansas	3	4	5	------	1	1	4	5	8	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	1	1	1	0	0	0
Maryland [3]	0	1	2	------	------	2	6	5	5	1	2	1
District of Columbia	0	1	1	------	------	------	1	1	1	1	1	0
Virginia	7	18	18	74	90	47	19	5	9	4	1	1
West Virginia	6	11	10	1	3	9	5	0	3	4	0	2
North Carolina	47	40	40	------	4	1	9	7	7	2	1	1
South Carolina	19	19	19	122	169	137	6	4	7	1	0	0
Georgia	32	21	24	36	27	7	1	1	1	0	0	0
Florida	3	5	5	5	1	1	3	6	3	2	0	0
EAST SOUTH CENTRAL												
Kentucky	8	19	13	1	------	------	3	10	12	2	0	0
Tennessee	17	14	14	6	9	9	13	5	5	6	6	1
Alabama	16	18	20	17	10	7	2	4	4	6	0	1
Mississippi [3]	12	9	12	------	------	------	------	------	------	1	0	0
WEST SOUTH CENTRAL												
Arkansas	5	17	17	5	7	6	11	4	5	1	0	0
Louisiana	7	0	6	7	------	2	1	0	1	2	0	0
Oklahoma	3	7	8	1	10	16	3	1	2	1	0	1
Texas	26	30	30	284	156	83	28	11	22	2	0	1
MOUNTAIN												
Montana	4	0	0	------	------	------	12	0	3	0	0	1
Idaho	0	0	0	1	------	------	0	1	2	0	0	0
Wyoming	0	0	0	------	9	------	1	3	1	0	1	0
Colorado	3	8	8	4	21	5	4	4	4	0	0	0
New Mexico	1	2	2	1	------	1	0	0	1	0	1	0
Arizona	1	1	0	34	55	23	3	3	3	2	0	0
Utah [3]	0	1	0	------	3	------	6	30	6	0	0	0
Nevada	0	0	------	------	------	------	13	0	------	1	0	------
PACIFIC												
Washington	3	7	2	------	------	------	13	43	8	2	1	1
Oregon	1	1	1	4	11	9	15	16	10	3	0	0
California	16	12	15	14	28	13	42	49	49	9	5	1
Total	302	349	349	657	700	444	780	492	561	135	43	30
37 weeks	8, 312	8, 541	9, 707	84, 051	83, 065	153, 176	540, 807	468, 877	468, 877	14, 153	2, 584	1, 544

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 18, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis: Week ended— Sept. 18, 1943	Poliomyelitis: Week ended— Sept. 19, 1942	Poliomyelitis: Median 1938–42	Scarlet fever: Week ended— Sept. 18, 1943	Scarlet fever: Week ended— Sept. 19, 1942	Scarlet fever: Median 1938–42	Smallpox: Week ended— Sept. 18, 1943	Smallpox: Week ended— Sept. 19, 1942	Smallpox: Median 1938–42	Typhoid and paratyphoid fever [3]: Week ended— Sept. 18, 1943	Typhoid and paratyphoid fever [3]: Week ended— Sept. 19, 1942	Typhoid and paratyphoid fever [3]: Median 1938–42
NEW ENGLAND												
Maine	2	0	0	8	6	6	0	0	0	0	0	3
New Hampshire	0	0	0	1	1	1	0	0	0	1	0	0
Vermont	2	2	1	2	3	3	0	0	0	0	4	1
Massachusetts	35	6	4	79	73	37	0	0	0	8	6	5
Rhode Island	20	0	1	6	2	1	0	0	0	1	1	0
Connecticut	32	6	3	16	15	11	0	0	0	0	1	3
MIDDLE ATLANTIC												
New York	65	27	27	79	78	72	0	0	0	9	7	21
New Jersey	8	20	20	21	22	15	0	0	0	4	3	5
Pennsylvania	18	15	15	57	66	61	0	0	0	6	20	22
EAST NORTH CENTRAL												
Ohio	20	9	13	64	87	58	0	0	0	7	7	14
Indiana	13	4	6	21	21	21	0	1	1	0	1	8
Illinois	208	52	25	55	49	52	0	0	0	9	10	12
Michigan [2]	29	8	20	39	27	55	0	0	0	4	1	7
Wisconsin	18	0	2	36	43	43	0	2	1	1	2	2
WEST NORTH CENTRAL												
Minnesota	10	5	9	25	14	16	0	0	0	0	1	2
Iowa	29	4	4	16	16	19	0	0	1	1	1	2
Missouri	13	3	2	27	18	18	0	0	0	4	4	10
North Dakota	2	0	1	15	4	4	0	0	0	0	0	1
South Dakota	4	1	2	4	10	8	0	0	1	0	0	0
Nebraska	13	11	5	9	7	8	0	0	0	0	0	0
Kansas	77	10	4	34	22	32	0	0	0	4	1	3
SOUTH ATLANTIC												
Delaware	0	3	0	0	4	4	0	0	0	0	0	0
Maryland [2]	2	0	1	15	18	13	0	0	0	4	2	4
District of Columbia	2	0	1	4	8	8	0	0	0	1	1	1
Virginia	6	0	3	27	28	20	0	0	0	8	6	14
West Virginia	1	0	0	74	28	28	0	1	0	1	6	12
North Carolina	1	1	3	69	36	46	0	0	0	7	5	13
South Carolina	1	3	3	8	18	9	0	0	0	3	13	13
Georgia	4	0	2	24	23	12	0	0	0	8	2	11
Florida	6	1	2	7	5	4	0	0	0	1	1	4
EAST SOUTH CENTRAL												
Kentucky	5	5	9	24	29	29	0	0	0	9	14	23
Tennessee	0	3	3	28	27	27	0	3	2	10	14	14
Alabama	0	0	1	25	32	18	0	0	0	2	5	9
Mississippi [2]	2	3	3	8	2	6	0	0	0	5	5	8
WEST SOUTH CENTRAL												
Arkansas	2	8	1	4	4	4	0	1	1	6	8	15
Louisiana	4	0	0	5	2	2	0	1	0	12	6	13
Oklahoma	26	0	2	0	6	10	0	0	1	2	5	12
Texas	57	2	3	18	16	25	1	0	0	8	28	47
MOUNTAIN												
Montana	4	0	0	9	9	10	0	0	0	0	0	2
Idaho	1	0	1	11	3	3	0	0	0	0	0	3
Wyoming	1	0	0	3	1	1	0	0	0	0	0	0
Colorado	35	4	4	18	9	13	0	0	0	1	4	4
New Mexico	8	2	2	2	0	2	0	0	0	3	5	3
Arizona	2	0	0	1	1	1	0	0	0	3	5	3
Utah [2]	41	0	3	10	4	7	0	0	0	0	0	0
Nevada	0	0	------	2	0	------	0	0	------	0	1	------
PACIFIC												
Washington	27	1	1	21	12	12	0	0	0	1	1	2
Oregon	14	0	2	11	8	8	0	0	0	0	2	2
California	150	10	10	77	32	55	0	0	0	5	10	10
Total	1,020	229	501	1,119	949	949	1	9	14	159	219	389
37 weeks	7,812	2,398	3,946	101,240	92,221	119,962	619	634	2,002	4,008	4,919	6,636

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September, 18, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended Sept. 18, 1943								
	Week ended—		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Sept. 18, 1943	Sept. 19, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	24	35	27	0	0	0	0	0	0	0	0	0
New Hampshire	2	0	0	0	0	0	0	0	0	0	0	0
Vermont	15	43	27	0	0	0	0	0	0	0	0	0
Massachusetts	95	215	134	0	0	4	0	0	0	0	0	0
Rhode Island	153	23	23	0	0	0	0	0	0	0	0	0
Connecticut	21	61	50	0	1	11	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	204	337	337	0	4	114	0	1	0	1	0	1
New Jersey	150	183	183	0	0	0	0	0	0	0	0	0
Pennsylvania	196	241	241	0	0	100	0	1	0	0	0	0
EAST NORTH CENTRAL												
Ohio	147	139	162	0	0	6	0	0	0	0	0	0
Indiana	25	48	31	0	0	0	0	0	0	0	0	0
Illinois	139	298	275	0	0	1	0	1	0	0	0	0
Michigan [2]	188	256	285	0	0	16	0	0	0	0	0	0
Wisconsin	249	204	204	0	0	0	0	1	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	60	55	55	0	0	1	0	0	0	0	0	0
Iowa	11	6	17	0	0	0	0	1	0	0	0	0
Missouri	18	1	19	0	0	0	2	0	0	0	1	0
North Dakota	7	4	5	0	0	0	0	0	0	0	0	0
South Dakota	11	0	4	0	0	0	0	1	0	0	0	0
Nebraska	6	9	6	0	0	0	0	0	0	0	0	0
Kansas	21	39	37	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	2	8	0	0	0	0	0	0	0	0	0
Maryland [2]	81	46	39	0	0	0	17	0	0	0	0	0
District of Columbia	14	23	23	0	0	0	0	0	0	0	0	0
Virginia	63	47	44	0	0	0	143	0	0	2	4	4
West Virginia	50	17	31	0	0	0	0	0	0	5	0	0
North Carolina	77	52	83	0	0	0	0	0	0	3	0	2
South Carolina	95	26	26	0	0	4	0	0	0	0	0	7
Georgia	10	9	9	0	0	1	0	0	0	0	1	62
Florida	12	5	8	0	3	0	0	0	0	0	0	7
EAST SOUTH CENTRAL												
Kentucky	63	24	41	0	0	1	0	0	0	1	0	0
Tennessee	47	28	29	0	0	0	11	0	0	0	1	7
Alabama	2	42	15	0	0	0	0	0	0	2	0	21
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	4
WEST SOUTH CENTRAL												
Arkansas	13	28	5	0	2	5	0	0	0	0	1	0
Louisiana	2	2	6	0	0	11	0	0	0	0	0	11
Oklahoma	6	4	8	0	0	0	0	0	0	0	0	0
Texas	107	99	88	0	29	108	0	2	0	0	1	41
MOUNTAIN												
Montana	22	34	34	0	0	0	0	0	0	0	0	0
Idaho	5	4	3	0	0	0	0	0	0	1	0	0
Wyoming	13	41	7	0	0	0	0	0	0	0	0	0
Colorado	9	17	17	0	1	1	0	1	0	0	0	0
New Mexico	2	14	15	0	0	4	5	0	0	0	0	1
Arizona	19	7	7	0	0	0	36	0	0	0	0	0
Utah [2]	54	14	30	0	0	0	0	1	0	0	0	0
Nevada	0	3	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	66	16	20	0	0	0	0	0	0	0	1	0
Oregon	19	15	16	0	0	0	0	0	0	0	0	0
California	179	187	187	0	1	13	0	11	0	0	0	0
Total	2,772	3,003	3,003	0	41	401	214	22	0	15	11	168
37 weeks	142,692	133,994	137,038	47	1,536	11,979	2,824	525	19	406	636	2,796
37 weeks, 1942	------	------	------	63	795	6,569	5,072	402	35	421	700	2,365

[1] New York City only. [2] Period ended earlier than Saturday.

[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 7; New York, 2; Illinois, 1; Michigan, 2; South Carolina, 1; Georgia, 4; Tennessee, 4; Louisiana, 1; New Mexico, 1; California, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 4, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	1	0	0	0	2	0	0	2
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	3	1	8	11	18	0	0	21
Fall River	0	0	------	1	0	0	0	1	1	0	0	0
Springfield	0	0	------	0	1	0	2	0	1	0	0	0
Worcester	0	0	------	0	0	0	6	0	5	0	0	4
Rhode Island:												
Providence	0	0	------	0	6	0	1	5	3	0	0	6
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	2	0	0	0	2
Hartford	0	0	------	1	0	0	0	1	0	0	0	0
New Haven	0	0	------	0	0	1	1	9	0	0	0	2
MIDDLE ATLANTIC												
New York:												
Buffalo	1	0	------	1	0	0	4	4	2	0	0	4
New York	5	1	2	0	45	12	36	43	28	0	8	71
Rochester	0	0	------	0	0	0	3	0	1	0	0	5
Syracuse	0	0	------	0	1	1	0	1	2	0	0	13
New Jersey:												
Camden	0	0	------	0	0	0	2	1	0	0	0	1
Newark	0	0	------	0	6	0	2	2	4	0	1	11
Trenton	0	0	------	0	0	0	0	0	0	0	0	0
Pennsylvania:												
Philadelphia	1	1	------	0	5	4	9	1	8	0	2	36
Pittsburgh	0	0	2	2	5	3	9	0	4	0	3	17
Reading	0	0	------	0	1	0	0	0	0	0	0	12
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	0	2	1	0	2	7	0	0	8
Columbus	3	0	2	2	6	0	0	0	2	0	0	5
Indiana:												
Fort Wayne	0	0	------	0	0	0	2	0	0	0	0	0
Indianapolis	0	0	------	0	2	1	4	0	1	0	1	29
South Bend	0	0	------	0	1	0	0	1	1	0	0	0
Terre Haute	0	0	------	0	0	0	2	0	0	0	0	0
Illinois:												
Chicago	5	0	------	1	5	3	12	150	14	0	1	75
Springfield	0	0	------	0	1	0	0	0	1	0	0	0
Michigan:												
Detroit	1	0	------	0	14	3	11	3	9	0	5	45
Flint	0	0	------	0	0	0	0	1	3	0	0	1
Grand Rapids	0	0	------	0	4	0	1	0	1	0	0	27
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	0	0	0	2
Milwaukee	0	0	------	0	5	0	5	4	9	0	0	75
Racine	0	0	------	0	1	0	1	0	1	0	0	15
Superior	0	0	------	0	7	0	0	0	2	0	0	1

City reports for week ended September 4, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	2	0	0	0	4	0	0	10
Minneapolis	1	0	------	0	5	2	3	4	2	0	0	3
St. Paul	0	0	------	0	2	0	1	2	3	0	0	29
Missouri:												
Kansas City	0	1	------	0	3	1	6	9	4	0	1	3
St. Louis	0	0	------	0	5	3	9	2	1	0	1	10
North Dakota:												
Fargo	0	0	------	0	4	0	1	0	0	0	0	0
Nebraska:												
Omaha	2	0	------	0	0	0	0	15	2	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	0	0	0	0	0	2
Wichita	0	0	------	0	0	0	1	6	2	0	0	2
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0	------	0	0	1	0	1	0	0	0	1
Maryland:												
Baltimore	0	0	1	0	9	3	10	0	5	0	0	49
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	1	0	3	2	2	0	2	0	3	24
Virginia:												
Lynchburg	0	0	------	0	19	0	0	0	0	0	0	11
Richmond	0	0	1	0	0	2	2	1	0	0	1	1
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	2	0	0	0	0	0	0	0
Wheeling	0	0	------	0	0	1	0	0	0	0	0	13
North Carolina:												
Winston-Salem	1	0	------	0	1	0	1	0	2	0	0	6
South Carolina:												
Charleston	0	0	------	0	2	0	0	0	1	0	0	1
Georgia:												
Atlanta	0	0	------	0	0	0	5	0	0	0	0	2
Brunswick	0	0	------	0	0	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	6	0	0	0
Florida:												
Tampa	0	0	------	0	0	0	0	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	1	0	0	6	0	1	0	0	5
Nashville	0	0	------	0	0	0	4	0	1	0	3	11
Alabama:												
Birmingham	0	0	2	1	2	0	4	0	1	0	0	1
Mobile	2	0	------	0	0	0	2	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	2	0	0	0	0	0
Louisiana:												
New Orleans	0	0	3	1	0	2	6	1	0	0	1	5
Shreveport	0	0	------	0	0	0	2	0	0	0	0	0
Texas:												
Dallas	3	0	------	0	0	0	1	5	0	0	0	4
Galveston	1	0	------	0	0	0	0	1	0	0	0	2
Houston	2	1	------	0	1	2	5	1	0	0	1	1
San Antonio	2	0	1	1	0	0	8	1	0	0	0	0

City reports for week ended September 4, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	1	0	0	0
Great Falls	0	0	------	0	5	0	0	2	2	0	0	2
Helena	0	0	------	0	0	0	0	0	0	0	0	2
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	10	0	------	0	2	0	2	7	6	0	1	21
Pueblo	1	0	------	0	0	0	2	5	2	0	0	1
Utah:												
Salt Lake City	0	0	------	0	1	0	0	13	2	0	0	24
PACIFIC												
Washington:												
Seattle	0	0	------	0	2	0	4	3	1	0	0	13
Spokane	0	0	1	1	1	0	1	1	2	0	0	5
Tacoma	0	0	------	0	0	0	1	2	0	0	0	1
California:												
Los Angeles	3	0	4	0	11	5	8	23	5	0	0	29
Sacramento	0	2	------	0	0	0	1	7	0	0	0	2
San Francisco	0	1	------	0	4	0	9	6	10	0	0	9
Total	46	7	20	13	208	54	226	360	198	0	83	795
Corresponding week, 1942	39	5	26	10	121	19	227	56	194	0	32	1,091
Average, 1938–42	54	------	27	[1] 7	[2] 145	------	[1] 204	------	199	2	51	1,143

[1] 3-year average, 1940–42.
[2] 5-year median.
Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: Boston, 1; New York, 2.
Dysentery, bacillary.—Cases: Buffalo, 9; New York, 2; Rochester, 3; Chicago, 1; Detroit, 7; Charleston, S. C., 15; Nashville, 2; Los Angeles, 9.
Dysentery, unspecified.—Cases: Baltimore, 10; Richmond, 6; San Antonio, 6; Sacramento, 1.
Rocky Mountain spotted fever.—Cases: New York, 1.
Typhus fever.—Cases: Charleston, S. C., 2; Atlanta, 1; New Orleans, 1; Dallas, 6; Galveston, 2; Houston, 7.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 33,727,100)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
NEW ENGLAND	0.0	0.0	0.0	5.0	27.3	5.0	47.2	72.1	74.5	0.0	0.0	92
MIDDLE ATLANTIC	3.1	0.9	1.8	1.3	28.1	8.9	29.0	23.2	21.9	0.0	6.2	76
EAST NORTH CENTRAL	6.5	0.0	1.3	1.9	31.1	5.2	24.6	104.4	33.1	0.0	4.5	183
WEST NORTH CENTRAL	6.0	2.0	0.0	0.0	42.1	12.0	42.1	76.2	36.1	0.0	4.0	118
SOUTH ATLANTIC	3.5	0.0	5.2	0.0	62.5	15.6	34.7	3.5	27.8	0.0	6.9	187
EAST SOUTH CENTRAL	11.9	0.0	11.9	11.9	11.9	0.0	95.0	0.0	17.8	0.0	17.8	101
WEST SOUTH CENTRAL	23.5	2.9	11.7	5.9	2.9	11.7	55.7	26.4	0.0	0.0	5.9	35
MOUNTAIN	88.4	0.0	0.0	0.0	64.3	0.0	82.2	217.1	104.5	0.0	8.0	402
PACIFIC	5.2	5.2	8.7	1.7	31.5	8.7	41.9	73.4	31.5	0.0	0.0	103
TOTAL	7.1	1.1	3.1	2.0	32.2	8.3	34.9	55.7	30.6	0.0	5.1	123

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 21, 1943.—During the week ended August 21, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		12	5	20	34	5	12	9	19	116
Diphtheria		4	1	14	1	8		3	2	33
Dysentery (bacillary)				1		1				2
Encephalitis, infectious						1				1
German measles				2	7		3	8	3	23
Influenza			2		4					6
Measles		5		43	67	21	10	65	21	232
Meningitis, meningococcus				3	1					4
Mumps		7		5	54	7	4	14	13	104
Poliomyelitis		1		6	2			1		10
Scarlet fever	1	13	1	27	20	7	3	13	15	100
Tuberculosis (all forms)	3		6	103	43	13		40	26	234
Typhoid and paratyphoid fever			2	29	2	2			1	36
Whooping cough		35		65	123	27	19	21	24	314

JAMAICA

Notifiable diseases—4 weeks ended August 28, 1943.—During the 4 weeks ended August 28, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	5	70	Leprosy		2
Diphtheria	2	4	Tuberculosis	26	73
Dysentery	5	1	Typhoid fever	11	59
Erysipelas	1	1	Typhus fever	3	

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-June 1943	July 1943	August 1943—week ended— 7	14	21	28
ASIA							
Ceylon	C	50					
India	C	100,918	35,989				
Bombay	C	3					
Calcutta	C	2,036	1,310	111			
Chittagong	C	16	119				
Cochin	C		99				
Madras	C	964	10				
Negapatam	C	6	15				
Vizagapatam	C	4	9				
India (French)	C	49					
Chandernagor	C	4					
Karikal	C	28					
Pondichery	C	17					

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		January-June 1943	July 1943	August 1943—week ended— 7	14	21	28
AFRICA							
Basutoland [1]	C	11					
Belgian Congo—Plague-infected rats		P					
British East Africa:							
Kenya	C	11	3				
Uganda	C	13	1	4			
Egypt: Port Said	C		3	1		1	
Madagascar	C	17					
Morocco (French)	C	225	1				
Senegal	C	202	30				
Dakar	C	18	9		3	1	
Union of South Africa	C	53					
ASIA							
India	C	1,254	236				
Indochina	C	15	4				
Palestine	C	11	1				
SOUTH AMERICA							
Peru:							
Lambayeque Department	C	2					
Libertad Department	C	15					
Lima Department	C	3					
Lima	C	1					
Plague-infected rats		P					
Piura Department	C	2					
Venezuela	C		10				
OCEANIA							
Hawaii Territory:							
Hamakua District	D	4					1
Plague-infected rats		[2] 66	3				8

[1] For the period June 12-30, 1943, pneumonic plague occurred in a village near Mafeteng, Basutoland, all cases being fatal.
[2] Includes 3 plague-infected mice.

SMALLPOX

[C indicates cases; D, deaths]

Place		January–June 1943	July 1943	August 1943—week ended— 7	14	21	28
AFRICA							
Algeria	C	721	107		72		
Angola	C	570					
Basutoland	C	38					
Belgian Congo	C	1,487	511	88	83		
British East Africa:							
Kenya	C	20	689	93			
Mombasa	C	3					
Tanganyika	C	11					
Dahomey	C	139					
Egypt	C	1,086	571	100			
French Guinea	C	235	2				
Gold Coast	C	5	10				
Ivory Coast	C	126	1				
Mauritania	C	1	6				
Morocco (French)	C	707	1				
Mozambique	C	1					
Nigeria	C	3,563	472				
Niger Territory	C	160	2				
Senegal	C	57	1				
Sierra Leone	C	3					
Sudan (French)	C	2,084	572				
Union of South Africa	C	224	1				
ASIA							
Arabia	C		1				
Ceylon	C	2		1			
India	C	18,932	5,254				
India (French)	C	10					
Indochina	C	3,676	301				
Iran	C	473	23				
Iraq	C	186	6	1			
Palestine	C	101					
Syria and Lebanon	C	796	102				
Trans-Jordan	C	17					
EUROPE							
Belgium	C	1					
France	C	2					
Germany	C	1					
Scotland	C	1					
Portugal	C	34	3	1	1		
Spain	C	184					
Switzerland	C	7					
Turkey	C	6,344	283		[1] 283		
NORTH AMERICA							
Canada	C	1	3	2			
Guatemala	C	5	21				
Mexico	C	170	41				
SOUTH AMERICA							
Brazil	C	41					
British Guiana	C	1					
Colombia	C	183					
Ecuador	C	10					
Peru	D	9	2				
Venezuela	C	36	17				

[1] For 2 weeks.

TYPHUS FEVER

[C indicates cases]

Place		January–June 1943	July 1943	August 1943—week ended— 7	14	21	28
AFRICA							
Algeria	C	7,454	350				
Belgian Congo	C	2	6		12		
British East Africa:							
Kenya	C	6					
Mombasa	C	1					
Uganda	C	1					
Egypt	C	34,469	3,717	415			
Gold Coast	C	6	1				
Morocco (French)	C	12,837					
Morocco (Spanish)	C	64					

TYPHUS FEVER—Continued

[C indicates cases]

Place		January–June 1943	July 1943	August 1943—week ended—			
				7	14	21	28
AFRICA—continued							
Nigeria	C	7	1				
Rhodesia, northern	C	4	4				
Senegal	C	2					
Dakar	C				3	6	
Sierra Leone	C	3					
Tunisia	C		50				
Union of South Africa	C	779	2				
ASIA							
Afghanistan	C	520					
China: Shanghai	C	12					
India	C	1,052	9				
Iran	C	8,357					
Iraq	C	1,375	38				
Palestine	C	198	30	4	2	4	
Syria and Lebanon	C	48	25				
Trans-Jordan	C	12					
EUROPE							
Bulgaria	C	[1] 1,250					
France—Seine Department	C	2					
Germany	C	[2] 800					
Hungary	C	658	34	6	10		
Irish Free State	C	19					
Portugal	C	5	2				
Rumania	C	6,262	403	69		84	
Slovakia	C	325	41	22	19		
Spain	C	493	36				
Turkey	C	3,334	206		[3] 206		
NORTH AMERICA							
Guatemala	C	537	106				
Jamaica	C	12	1	1	1		1
Mexico	C	716	59				
Puerto Rico	C	2					
SOUTH AMERICA							
Chile	C	153	12	3	1		
Ecuador	C	183	11				
Peru	C	8	1				
Venezuela	C	10					
OCEANIA							
Australia	C	62	9	1	6		
Hawaii Territory	C	11					

[1] For the period Jan. 1 to July 14, 1943.
[2] For the first 7 weeks of 1943.
[3] For 2 weeks.

YELLOW FEVER

[C indicates cases; D, deaths]

AFRICA							
Belgian Congo:							
Bondo	D	1					
Kinzao	D		1				
Leopoldville	C	1					
Stanleyville	D	1					
Yanonge	C	1					
Sierra Leone: Freetown	C	[1] 1					
SOUTH AMERICA							
Brazil: Para State	D		1				
Colombia:							
Cundinamarca Department	D	3					
Intendencia of Meta	D	2					

[1] Suspected.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON: 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Tuberculosis Mortality in the United States

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Public Health Reports

Vol. 58 • OCTOBER 1, 1943 • *No. 40*

TUBERCULOSIS MORTALITY IN THE UNITED STATES: 1939–41 [1, 2]

By J. YERUSHALMY, *Principal Statistician*, H. E. HILLEBOE, *Senior Surgeon*, and C. E. PALMER, *Surgeon, United States Public Health Service*

The Bureau of the Census has in recent years released more detailed mortality data than in previous years. These data, when correlated with the detailed figures on the composition of the population which became available from the 1940 Census, make possible more comprehensive analyses of tuberculosis mortality than have heretofore been possible. It is the object of this paper to assemble and analyze, for purposes of easy reference, the material on tuberculosis which may be found in recent publications of the Bureau of the Census.

Even a casual review of statistics on tuberculosis reveals the extraordinary progress that has been made in the control of the disease since the beginning of the century. The mortality rate was cut in half during the first 20 years and then halved again by 1940, that is, the 1940 rate was less than one-fourth that at the beginning of the century.

This favorable trend continued through 1941; the rate for that year established an all-time low record. This is all the more encouraging in view of the expanding defense activities in 1941, which imposed great strains on the housing, sanitary, hospital, and medical facilities of many communities. Whether the transition from a period of defense activities to a war economy had an inhibiting effect on the downward trend of tuberculosis mortality cannot now be determined with certainty. Such fragmentary figures as are now available for 1942 indicate that for the country as a whole there has been no serious

[1] From the Tuberculosis Control Section, States Relations Division, and the Division of Public Health Methods, National Institute of Health.

The authors are indebted to Miss Jennie C. Goddard of the National Institute of Health for her assistance in analysis and in assembling the material.

[2] Based on data released by the Bureau of the Census in its annual publications and in Special Reports, as well as on some unpublished material made available by the Division of Vital Statistics of the Bureau of the Census, for which grateful acknowledgment is hereby made.

reversal of the trend. However, preliminary figures for some individual States are not so favorable. Provisional figures for the last quarter of 1942 reported from 35 States to the Public Health Service show only a slight increase when compared with similar figures for 1941. It may, however, be significant that in its analysis of the first 10-percent sample of death certificates (for August through November 1942) the Bureau of the Census states: "Tuberculosis forms a higher proportion of the deaths from all causes in both urban and rural 'critical areas' than in urban and rural 'noncritical areas.'" [3]

Many of the environmental conditions known to be associated with tuberculosis mortality and morbidity are aggravated during a period of national peril. In the previous World War tuberculosis mortality increased sharply in all countries in Europe. In addition the majority of tuberculosis victims are found in the age groups which furnish the greater part of the fighting men and industrial workers. The course of the disease during the war period is therefore of paramount importance.

The long-range aspects of the tuberculosis problem may also be greatly influenced by the course of the disease and by the measures taken for its control during the war period. Already certain factors are operating which will have a profound effect on the future of tuberculosis and its control. Chest X-ray films of millions of people are being taken now by induction stations and in mass surveys in war industries. Through these efforts tens of thousands of tuberculosis cases, primarily in the minimal stages, are discovered and brought to the attention of health officials. As a result, two facts stand out clearly: the case load of known tuberculosis will be at least doubled in a very short period of time; in addition it will contain proportionately many more minimal cases than the present case load. Radical changes in procedures for tuberculosis control are consequently indicated.

The presentation at this time of the most recent record of tuberculosis mortality may therefore serve not only as a measure of past accomplishments but also as a base line for evaluating the success with which the very difficult problems of the immediate future will be met.

TUBERCULOSIS MORTALITY, 1939–41

In the 3-year period 1939–41, 181,288 deaths with tuberculosis as the primary cause were recorded in the continental United States. The average number of deaths per year was 60,429 and the average annual death rate per 100,000 population was 45.9. Tuberculosis (all forms) was seventh in numerical importance among the leading causes of death and accounted for 4.3 percent of deaths from all causes.

[3] Current Mortality Analysis, Vol. 1, No. 1, February 5, 1943.

Tuberculosis of the respiratory system accounted for more than 90 percent of all tuberculosis deaths.

Tuberculosis mortality is much higher among males than among females; the death rate for males in 1939–41 (53.6) was 41 percent higher than that for females (38.1). This excess in mortality among males is higher for tuberculosis than that for deaths from all causes; tuberculosis deaths formed 4.5 percent of all deaths among males and 4.0 percent among females.

There are very large racial differences in tuberculosis mortality; the rate for Negroes in 1940 (123.5) was nearly three and one-half times that for whites (36.6). The rate for Indians, Chinese, and other races was about double that for Negroes. This excess in the rate among nonwhites is larger than the excess in the total death rate: among whites tuberculosis accounted for only 3.6 percent of all deaths, among Negroes the percentage was 8.9, and among other races nearly one out of every five deaths was due to tuberculosis. Among nonwhites tuberculosis was third in numerical importance as a leading cause of death.

Age-specific mortality rates.—The death rate from tuberculosis (all forms) is very much higher in the older age groups than in the younger. The rate in 1940 was higher among infants (24.6) than among children 5–14 years of age, where it was at a minimum (5.5), increased rapidly in early adulthood, and continued to rise steadily with age. Table 1 and figure 1 present age-specific death rates by sex and race for 1939–41. A number of points of interest appear in figure 1. It may be seen that among children and young adults the rates for females are higher than those for males, but, beginning with age 30 and to the end of the life span, the rate is very much higher among males than among females, in both whites and nonwhites. Striking racial differences appear in the age-specific mortality rates. Among whites the rate increases with age but among nonwhites the highest rates are attained during the most productive age periods rather than at old age. Among nonwhite females the peak of mortality is reached in the age group 25–29. It is of interest that a similar situation obtained among the white population prior to 1930, as will be seen later. It was not until the early thirties that the age-specific mortality curve for whites flattened out. Figure 1 may also serve to indicate that the higher mortality rates for nonwhites are not due entirely to differences in age distribution of the races, since the increased mortality is present at practically all ages.

In addition to the age-specific death rates it is also of interest to consider the distribution of tuberculosis deaths by age, that is, what percentage of tuberculosis deaths occur in each age group. This obviously is not a measure of the risk of death from tuberculosis in the various age groups; however, from the point of view of

TABLE 1.—*Mortality from tuberculosis (all forms) by age, sex, and race: United States, 1939–41*

Race	Sex	Age: Under 5	5–9	10–14	15–19	20–24	25–29	30–34	35–44	45–54	55–64	65–74	75 and over	All ages[1]
DEATH RATE PER 100,000 POPULATION														
All races	Both sexes	15.3	4.4	6.8	27.5	49.4	56.2	56.7	59.2	66.9	75.3	80.0	77.6	45.9
	Male	15.5	4.6	5.2	20.0	40.5	51.0	59.9	74.2	96.1	107.0	104.5	89.5	53.6
	Female	15.1	4.2	8.5	35.0	57.9	61.2	53.6	44.1	36.1	42.1	56.0	67.2	38.1
White	Both sexes	11.0	2.8	3.6	14.7	30.8	38.7	41.6	46.2	57.6	69.7	77.9	76.8	36.6
	Male	11.1	3.0	2.9	10.7	24.2	34.6	43.7	58.8	84.2	100.4	101.2	87.2	44.3
	Female	10.9	2.7	4.3	18.9	37.1	42.7	39.4	33.6	29.5	37.8	55.1	67.6	28.8
Nonwhite	Both sexes	45.6	15.5	30.6	129.4	203.6	201.9	191.6	172.4	168.6	150.3	106.6	90.6	127.4
	Male	47.6	16.4	22.3	97.1	184.4	195.4	208.9	213.6	225.7	192.3	142.9	124.2	137.3
	Female	43.7	14.6	39.0	159.7	220.2	207.7	175.6	133.2	108.2	102.7	67.6	60.6	117.9
AVERAGE ANNUAL NUMBER OF DEATHS, 1939–41														
All races	Both sexes	1,613	475	800	3,388	5,720	6,236	5,811	10,846	10,373	7,960	5,104	2,052	60,429
	Male	831	251	307	1,234	2,306	2,782	3,038	6,803	7,650	5,785	3,308	1,109	35,433
	Female	782	224	493	2,154	3,413	3,454	2,774	4,043	2,724	2,174	1,796	943	24,996
White	Both sexes	1,014	265	373	1,616	3,180	3,828	3,827	7,604	8,183	6,865	4,596	1,904	43,283
	Male	520	141	152	588	1,239	1,690	2,000	4,848	6,143	5,042	2,955	1,013	26,351
	Female	494	124	220	1,028	1,941	2,138	1,827	2,757	2,041	1,823	1,640	891	16,932
Nonwhite	Both sexes	598	210	427	1,772	2,540	2,408	1,984	3,241	2,190	1,095	508	148	17,146
	Male	311	110	154	645	1,067	1,092	1,038	1,955	1,507	744	353	96	9,083
	Female	288	100	273	1,126	1,473	1,316	946	1,286	683	351	155	52	8,064
ENUMERATED POPULATION, 1940 (IN THOUSANDS)														
All races	Both sexes	10,542	10,685	11,746	12,334	11,588	11,097	10,242	18,333	15,512	10,572	6,376	2,643	131,669
	Male	5,355	5,419	5,952	6,180	5,692	5,451	5,070	9,165	7,962	5,409	3,167	1,239	66,062
	Female	5,187	5,266	5,794	6,153	5,895	5,646	5,172	9,168	7,550	5,163	3,209	1,404	65,608
White	Both sexes	9,230	9,329	10,353	10,964	10,340	9,904	9,206	16,453	14,213	9,844	5,900	2,480	118,215
	Male	4,701	4,745	5,259	5,516	5,114	4,892	4,573	8,250	7,294	5,022	2,920	1,162	59,449
	Female	4,528	4,584	5,094	5,448	5,227	5,012	4,633	8,203	6,919	4,821	2,979	1,318	58,766
Nonwhite	Both sexes	1,312	1,356	1,393	1,369	1,248	1,192	1,036	1,880	1,299	729	477	163	13,454
	Male	653	674	693	664	579	559	497	915	668	387	247	77	6,613
	Female	659	681	700	705	669	634	539	965	631	342	230	86	6,841

[1] Includes a small number unrecorded as to age.

control programs, it is of importance to know in which age groups tuberculosis deaths are concentrated. Table 2 and figure 2 present this information. It becomes immediately apparent that a large proportion of tuberculosis deaths occur in males during the most productive industrial years and in females during the childbearing period; nearly one-half of all tuberculosis deaths occur between the ages of

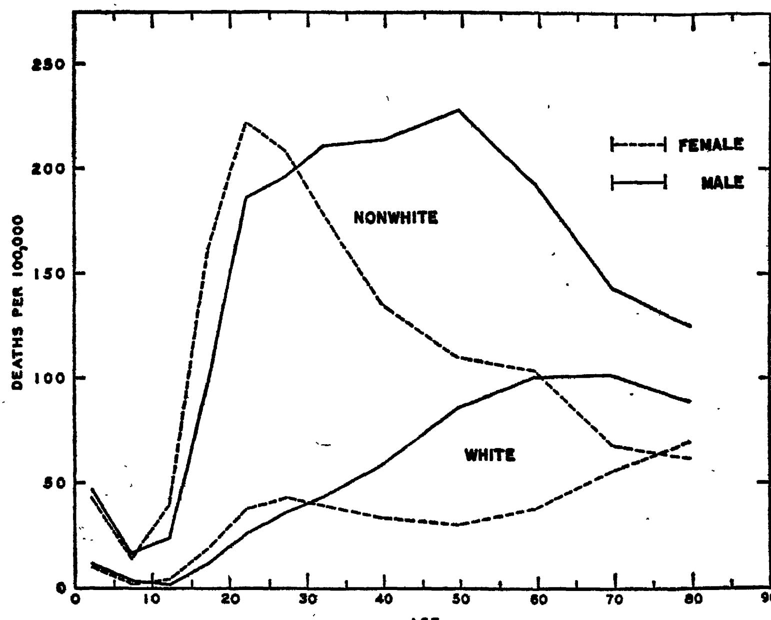

FIGURE 1.—Mortality from tuberculosis (all forms) by age; average annual rate (per 100,000) by sex and race: United States, 1939–41.

20 and 45 years. The concentration of deaths at these ages was even more pronounced among nonwhites, where nearly 60 percent of the deaths occurred at this most productive age period. Although it is undoubtedly true that some of the deaths at these ages are the final outcome of disease contracted earlier, nevertheless experience has shown that significant tuberculosis may be most readily found at the ages when people are most intensely engaged in gainful occupations.

Of particular importance is the quantitative study of the contribution which tuberculosis deaths make to deaths from all causes in the various age groups; in other words, of every 100 deaths from all causes in each age group, how many are due to tuberculosis. The remarkable decrease in tuberculosis mortality, which resulted in lowering tuberculosis from one of first rank in numerical importance to seventh, conceals the fact that this favorable situation does not hold

TABLE 2.—*Percentage distribution of deaths from tuberculosis (all forms) by age, sex, and race: United States, 1939–41*

(Tuberculosis deaths in each age-sex group shown as percentage of all tuberculosis deaths in each racial group)

Age	All races			White			Nonwhite		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Under 5	2.7	1.4	1.3	2.3	1.2	1.1	3.5	1.8	1.7
5–9	.8	.4	.4	.6	.3	.3	1.2	.6	.6
10–14	1.3	.5	.8	.9	.4	.5	2.5	.9	1.6
15–19	5.6	2.0	3.6	3.7	1.4	2.4	10.3	3.8	6.6
20–24	9.5	3.8	5.6	7.3	2.9	4.5	14.8	6.2	8.6
25–29	10.3	4.6	5.7	8.8	3.9	4.9	14.0	6.4	7.7
30–34	9.6	5.0	4.6	8.8	4.6	4.2	11.6	6.1	5.5
35–44	17.9	11.3	6.7	17.6	11.2	6.4	18.9	11.4	7.5
45–54	17.2	12.7	4.5	18.9	14.2	4.7	12.8	8.8	4.0
55–64	13.2	9.6	3.6	15.9	11.6	4.2	6.4	4.3	2.0
65–74	8.4	5.5	3.0	10.6	6.8	3.8	3.0	2.1	.9
75 and over	3.4	1.8	1.6	4.4	2.3	2.1	.9	.6	.3
All ages	100.0	58.6	41.4	100.0	60.9	39.1	100.0	53.0	47.0

for all age groups; from early adulthood to age 35 tuberculosis is still the first killer.

Tuberculosis is among the first three leading causes of death for a relatively large portion of the life span (15–49 years of age). It holds first place at ages 15–34, second at 35–39, and third at 40–49.

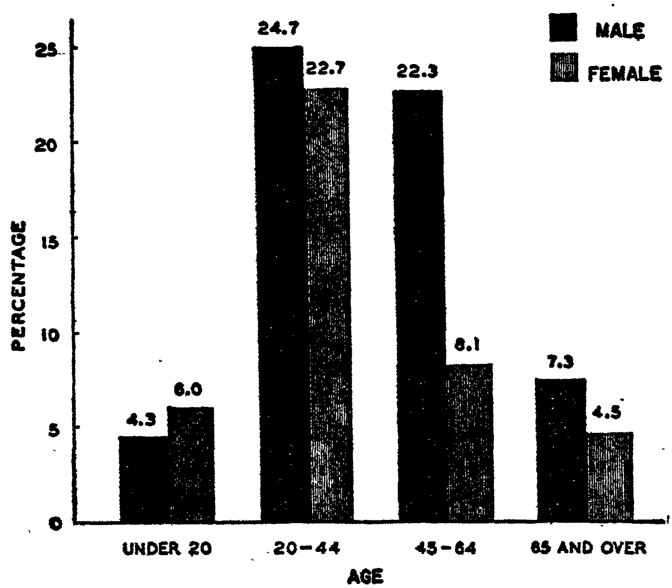

FIGURE 2.—Percentage distribution of deaths from tuberculosis (all forms) by age and sex: United States, 1939–41. (Tuberculosis deaths in each age-sex group shown as percentage of all tuberculosis deaths.)

For males tuberculosis is among the first three leading causes of death at ages 15–54 and for females at ages 10–44. For whites it is among the first three leading causes of death at ages 15–49; for both sexes,

ages 20–54 for males and 15–44 for females. For nonwhites, tuberculosis is among the first three leading causes of death at ages 5–44 and holds first place for a relatively long span of life (ages 10–39).

Moreover, tuberculosis comprises a considerable part of deaths from all causes in many of the age groups. It may be seen from table 3 that even among whites one out of every six deaths at ages 20–34 is due to tuberculosis. The situation is much worse among nonwhites where every third death at ages 15–34 is the result of this disease.

Figure 3 shows the relation of tuberculosis deaths to deaths from all causes by age, that is, at each age group the number of deaths due to tuberculosis out of every 100 deaths from all causes is shown. The percentage starts at a low point in the younger ages, increases rapidly to reach a maximum at the most productive age periods, and declines continuously thereafter. The peaks in the curve are approximately 5 years earlier among females (20–24 years of age) than among males (25–29 years of age). The peaks reached at the childbearing period for females are considerably higher than those reached by males at the most productive industrial ages.

TABLE 3.—*Deaths from tuberculosis (all forms) as percentages of deaths from all causes, by age, sex, and race: United States, 1939–41*

PERCENT OF DEATHS FROM ALL CAUSES

Age	All races			White			Nonwhite		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Under 5	1.2	1.1	1.3	0.9	0.8	1.0	2.2	2.1	2.4
5–9	4.1	3.8	4.5	2.8	2.5	3.1	10.5	10.2	10.7
10–14	6.8	4.4	10.2	3.9	2.7	5.8	18.6	12.7	25.4
15–19	15.9	10.3	23.0	10.2	6.2	16.1	32.5	26.0	37.9
20–24	20.5	14.8	27.6	15.7	10.5	22.9	33.4	28.8	37.8
25–29	20.3	16.7	24.6	17.2	13.7	21.8	28.3	25.4	31.3
30–34	16.9	16.1	17.7	15.1	14.2	16.8	21.8	22.0	21.5
35–44	11.4	12.6	9.8	10.6	11.5	9.2	14.0	16.2	11.5
45–54	6.3	7.8	4.2	6.1	7.5	3.9	7.5	9.8	5.2
55–64	3.4	4.1	2.3	3.3	4.0	2.3	4.1	5.0	2.9
65–74	1.7	2.0	1.4	1.7	1.9	1.3	2.1	2.6	1.5
75 and over	.6	.7	.6	.6	.6	.6	.8	1.0	.6
All ages	4.3	4.5	4.0	3.6	3.9	3.2	9.3	9.2	9.5

AVERAGE ANNUAL NUMBER OF DEATHS FROM ALL CAUSES

Age	All races: Both sexes	Male	Female	White: Both sexes	Male	Female	Nonwhite: Both sexes	Male	Female
Under 5	136,549	77,281	59,267	109,224	62,130	47,094	27,324	15,151	12,173
5–9	11,610	6,646	4,964	9,601	5,567	4,034	2,009	1,079	930
10–14	11,748	6,900	4,849	9,459	5,683	3,776	2,290	1,217	1,073
15–19	21,325	11,976	9,349	15,872	9,495	6,377	5,453	2,481	2,972
20–24	27,919	15,533	12,386	20,318	11,831	8,487	7,601	3,702	3,899
25–29	30,707	16,675	14,033	22,197	12,372	9,825	8,511	4,303	4,208
30–34	34,457	18,831	15,626	25,354	14,123	11,231	9,103	4,708	4,395
35–44	95,295	54,091	41,204	72,066	42,046	30,020	23,229	12,045	11,184
45–54	163,371	98,554	64,818	134,092	82,424	51,668	29,280	16,130	13,150
55–64	232,662	139,685	92,977	205,653	124,743	80,910	27,009	14,942	12,067
65–74	300,343	168,512	131,831	276,559	155,039	121,520	23,784	13,473	10,311
75 and over	333,643	166,129	167,515	316,034	156,864	159,170	17,610	9,265	8,345
All ages	1,400,936	781,637	619,298	1,217,270	682,873	534,397	183,665	98,764	84,901

The data shown in table 3 and figure 3 have a practical application which is pertinent in these times. It is becoming extremely difficult to evaluate trends in tuberculosis mortality in many parts of the country because population estimates, on which mortality rates are based, are very unreliable. This is especially true for age-specific mortality rates which may be computed with a reasonable degree of accuracy only for a census year. The further removed from such a year, the less reliable become the data on age composition of the population. It thus becomes necessary to consider a useful index of the trend and current changes in tuberculosis mortality which is independent of population enumeration.

Figures similar to those shown in table 3, that is, the percentages of deaths from all causes which are due to tuberculosis, may well serve as such an index, particularly during the war period. The main limitation of this index is the fact that a radical change in the age-sex-race composition of the population will produce extreme changes in it even if no change occurred in the relative standing of tuberculosis

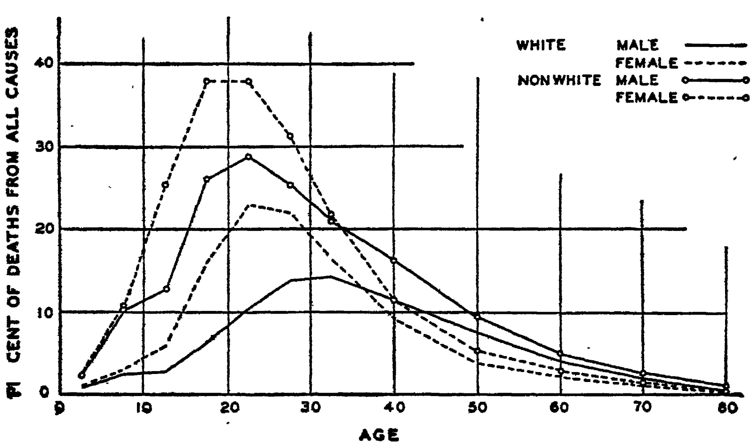

FIGURE 3.—Deaths from tuberculosis (all forms) as percentages of deaths from all causes, by age, sex, and race: United States, 1939–41.

mortality to mortality from all causes. However, this may easily be overcome when the index is constructed specific for these factors, as in table 3 and figure 3. If any one of the four curves presented in figure 3 be compared with a corresponding curve of a later period, it is possible to discover early the changes in tuberculosis mortality in relation to mortality from all causes. It is important to note that if an epidemic of considerable magnitude of any other disease occurs, the index may give a false sense of security in relation to tuberculosis because it may decrease owing to the inflated number of total deaths. These factors must therefore be taken into consideration when the index is used.

This index is the best available measure of changes in tuberculosis mortality in most areas and, if carefully studied, will serve as an indicator of the course of the disease, particularly in critical areas during the war period. Among its advantages, in addition to its complete independence of unknown population data, are the relative ease with which it may be obtained and the fact that it may be kept current at frequent intervals with little effort. It is, therefore, important for health departments to construct for their localities for previous years, curves similar to those shown in figure 3, and to keep them on a current basis for the purpose of observing changes in tuberculosis mortality that may be taking place.

Place of death and place of residence.—A relatively large proportion of tuberculosis deaths do not occur in the home and in many cases not even in the community in which the deceased resided. The tabulation of tuberculosis deaths according to place of death differs, therefore, from that according to place of residence. The former is influenced by the location of sanatoria, mental institutions, and general hospitals, while the latter comes nearer to measuring environmental and other conditions which are associated with tuberculosis. It cannot be said that present residence allocation procedures are completely satisfactory in the case of tuberculosis. Ideally each death should be allocated to the place where the disease was contracted but, because of the chronic nature of tuberculosis, that is very difficult to do in many cases. Nevertheless, rates based on residence figures are much more meaningful than those based on place of occurrence of death.

Table 4 presents for the year 1940 [4] the distribution of deaths from respiratory tuberculosis in three broad groups of communities: the larger cities (100,000 or more population), intermediate-sized cities (2,500 to 100,000 population), and rural areas. Figures are presented to show the number of deaths that occurred in these localities, the number of deaths of residents of these localities, and death rates computed on a residence basis. It may be seen that the number of persons who died in rural areas is larger than the number of residents of these areas who died. Conversely, deaths occurring in the larger cities are fewer than the number of deaths of residents of those same areas. This is an indication of the considerable movement of patients primarily to sanatoria, which are generally located in rural areas.

The differences in death rates from tuberculosis (all forms) in 1939–40 among residents of cities of specified size are shown in figure 4 for males and for females. It will be seen that the death rate for males is considerably higher among residents of the larger cities (71.4) than among residents of the intermediate-sized cities (52.3) and this in turn is much higher than the rate among residents of rural areas (44.0). It

[4] Similar figures for 1939 and 1941 are not available.

TABLE 4.—*Mortality from respiratory tuberculosis in cities of specified size and rural areas: Deaths that occurred in these areas, deaths to residents of these areas, and death rates on a residence basis, United States, 1940* [1]

Race	Sex	Cities of 100,000 or more	Cities of 2,500–100,000	Rural areas	All areas
DEATHS PER 100,000 RESIDENTS					
All races	Both sexes	50.1	40.4	38.2	42.2
	Male	65.6	48.4	41.5	50.2
	Female	35.1	32.7	34.6	34.2
White	Both sexes	37.8	33.0	31.4	33.7
	Male	52.1	40.9	35.4	41.7
	Female	24.1	25.5	27.1	25.7
Nonwhite	Both sexes	165.5	128.0	86.6	116.6
	Male	196.9	142.7	86.4	126.7
	Female	136.7	115.1	86.8	106.9
NUMBER OF DEATHS TO RESIDENTS OF AREA					
All races	Both sexes	19,017	14,707	21,852	55,576
	Male	12,218	8,596	12,331	33,145
	Female	6,799	6,111	9,521	22,431
White	Both sexes	12,998	11,103	15,787	39,888
	Male	8,791	6,715	9,261	24,767
	Female	4,207	4,388	6,526	15,121
Nonwhite	Both sexes	6,019	3,604	6,065	15,688
	Male	3,427	1,881	3,070	8,378
	Female	2,592	1,723	2,995	7,310
NUMBER OF DEATHS OCCURRING IN AREA					
All races	Both sexes	16,968	12,588	26,020	55,576
	Male	10,790	7,210	15,145	33,145
	Female	6,178	5,378	10,875	22,431
White	Both sexes	11,661	9,536	18,691	39,888
	Male	7,768	5,657	11,342	24,767
	Female	3,893	3,879	7,349	15,121
Nonwhite	Both sexes	5,307	3,052	7,329	15,688
	Male	3,022	1,553	3,803	8,378
	Female	2,285	1,499	3,526	7,310

[1] Unpublished data furnished by U. S. Bureau of Census.

is significant that the variation of the death rate with size of city is almost negligible for females. This may be indirect evidence of the association between tuberculosis and industrialization. A similar difference obtains by size of city for the white and for the nonwhite population.

More than one-half (56 percent) of all deaths from respiratory tuberculosis occurred in institutions. The percentage of institutional deaths was higher among whites (58 percent) than among nonwhites (52 percent). The distribution of deaths from respiratory tuberculosis in 1940 by type of institution in which they occurred is shown in table 5. The largest number of deaths occurred in tuberculosis hospitals (24 percent). The next largest number occurred in general hospitals (23 percent), and a relatively large number occurred in

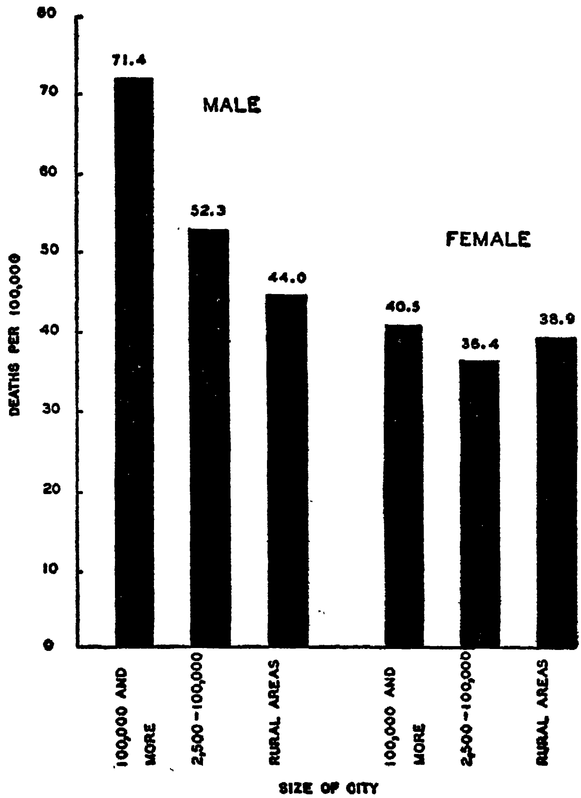

FIGURE 4.—Mortality from tuberculosis (all forms) among residents of cities of specified size and of rural areas by sex: United States, 1939-40.

mental institutions (6 percent). In terms of type of control of the institutions, the largest number of deaths occurred in governmental institutions (State, city, and county), in which 71 percent of the institutional deaths occurred. Fifteen percent of all institutional deaths occurred in private nonprofit institutions. More than 2,100 deaths from tuberculosis occur annually in institutions operated by the Public Health Service.

Deaths from respiratory and other forms of tuberculosis.—Tuberculosis of the respiratory system accounted for the largest proportion of all deaths from tuberculosis (92 percent). However, deaths from other forms of tuberculosis are by no means negligible since they amount to about 5,000 annually. Of nonrespiratory tuberculosis deaths, the largest number (about 1,400) are due to tuberculous meningitis, a considerable number are due to so-called disseminated or miliary tuberculosis (approximately 1,100 deaths), and the remainder are scattered among tuberculosis of various parts of the body. Although nonrespiratory tuberculosis accounts for fewer than 10 percent of all

tuberculosis deaths, it may be important to pay special attention to these types during the war period, since it was especially in nonrespiratory types of tuberculosis that the recent wartime increase occurred in England.

TABLE 5.—*Percentage and number of deaths from respiratory tuberculosis by type of institution in which they occurred: United States, 1940*

Place of death	Percentage			Number of deaths		
	All races	White	Nonwhite	All races	White	Nonwhite
Type of institution:						
In no institution	44.1	42.5	47.9	24,467	16,949	7,518
General hospitals	22.5	22.1	23.4	12,507	8,833	3,674
Maternal and infant hospitals	.1	.1	.1	57	44	13
Tuberculosis hospitals	23.7	24.7	21.1	13,146	9,839	3,307
Other nonresident hospitals	1.7	1.8	1.4	937	716	221
Nonresident institutions	.6	.5	.6	320	219	101
Mental institutions	6.4	7.2	4.3	3,550	2,876	674
Other resident institutions	1.1	1.0	1.1	592	412	180
Total deaths	100.0	100.0	100.0	55,576	39,888	15,688
Type of control:						
Indian Affairs	0.9		3.3	269	2	267
Army, Navy	.5	0.6	.4	171	141	30
U. S. Public Health Service and other	6.8	7.4	5.0	2,114	1,704	410
State, city, county	70.9	68.6	77.7	22,071	15,725	6,346
Nonprofit	14.9	16.8	9.6	4,641	3,857	784
Proprietary	3.1	3.6	1.8	971	828	143
Other	2.8	3.0	2.3	872	682	190
Deaths in institutions	100.0	100.0	100.0	31,109	22,939	8,170

The higher rate for males compared with that for females was present in both types but was more pronounced for respiratory than for "other forms" of tuberculosis. The difference between whites and nonwhites was also apparent in both types of tuberculosis but was greater in nonrespiratory tuberculosis. The rate for respiratory tuberculosis among males was 125.1 for nonwhites and 41.5 for whites, a ratio of 3 to 1; while for nonrespiratory tuberculosis the rates were 12.8 for nonwhites and 3.2 for whites, a ratio of 4 to 1.

The form of the death rate curve by age is not the same for the different types of tuberculosis. The main difference occurs in tuberculous meningitis. Figure 5 presents on a semilogarithmic scale death rates separately for pulmonary tuberculosis, tuberculous meningitis, and all other forms. It may be seen that the curve for tuberculous meningitis is different from that of either of the other two types. The latter two increase with age, while the curve for tuberculous meningitis decreases continuously with age. Whereas in early childhood there were nearly as many deaths from tuberculous meningitis as there were from pulmonary tuberculosis, in the older age groups the former is of negligible numerical importance.

The variation in the death rate by size of community was not much different for tuberculosis of the respiratory system than for other

forms. For example, the rate for pulmonary tuberculosis among whites was 38.6 in the larger cities and 31.6 in rural areas, while the rate for other forms of tuberculosis decreased from 3.1 to 2.6. Similar figures obtained for nonwhites, for whom the rate for respiratory tuberculosis was 167.4 in the larger cities and 86.7 in the rural areas, while for other forms of tuberculosis the rate was 19.8 in the larger

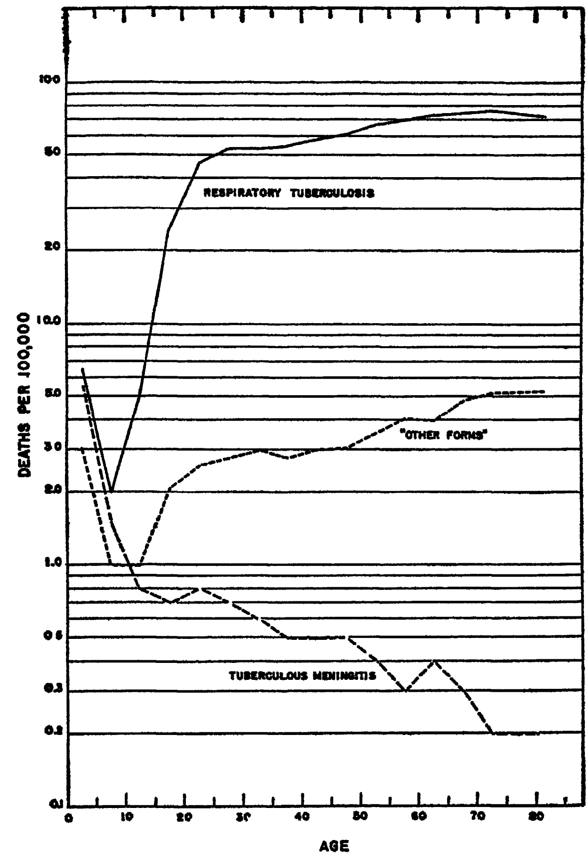

FIGURE 5.—Death rates (per 100,000) from pulmonary tuberculosis, tuberculosis meningitis, and from other forms of tuberculosis by age. United States, 1939–40

cities and 7.1 in the rural areas. It is interesting to note that, for both tuberculosis of the respiratory system and for other forms of tuberculosis, the difference between the death rate for whites and that for nonwhites increased with size of city. The ratio of the nonwhite rate to that of the white was nearly 5 to 1 in the larger cities and decreased continuously with size of community to 2.7 to 1 in the rural areas.

Contributory causes of death.—The statistics presented above are based on deaths which were assigned to tuberculosis as the primary cause of death. These do not represent all deaths due to the disease.

For one thing not all cases of tuberculosis are diagnosed and reported as such on death certificates. In addition, on a number of certificates more than one cause of death is stated. In such cases death is assigned to a primary cause by means of set rules specified in the Manual of Joint Causes. The understatement of tuberculosis deaths resulting from the latter is not very large because, according to the Manual, tuberculosis takes precedence over the great majority of other causes.

It is interesting to know the number of death certificates on which tuberculosis was mentioned and assigned either as a primary or a contributory cause of death. Such information is not available for all years. In 1940 there were recorded, in addition to the 60,428 deaths with tuberculosis (all forms) as a primary cause, 2,214 deaths which were assigned to other causes but in which tuberculosis was mentioned as a contributory cause. The total number of deaths with tuberculosis as primary or secondary cause was therefore 62,642 and, of that number, in 3.5 percent of the cases it was secondary.

Of the 60,428 deaths with tuberculosis as primary cause there were 13,898 (23 percent) in which other causes were mentioned as contributory. In addition on 6,442 certificates two forms of the disease were recorded and on 40,888 one form of tuberculosis was the only cause mentioned.

It is of interest to consider what causes are mentioned as contributory to tuberculosis and what are the primary causes to which tuberculosis is secondary. This information is presented in table 6. It may be seen that diseases of the heart are the most common cause secondary to tuberculosis. They accounted for 3,273 (23.6 percent) of the 13,898 tuberculosis deaths in which a secondary cause was

TABLE 6.—*Principal causes of death secondary to tuberculosis (all forms) and those to which tuberculosis (all forms) is secondary: United States, 1940*

CAUSES SECONDARY TO TUBERCULOSIS

Cause	Percent	Number
Diseases of heart (all forms)	23.6	3,273
Influenza and pneumonia (all forms)	13.7	1,903
Mental disease and deficiency	9.1	1,268
Diabetes mellitus	5.7	795
Nephritis (all forms)	5.7	788
All other causes	42.2	5,871
Total	100.0	13,898

CAUSES TO WHICH TUBERCULOSIS IS SECONDARY

Cause	Percent	Number
Syphilis (all forms)	40.9	906
Cancer (all forms)	25.4	563
Accidents	7.8	172
Diseases of heart (all forms)	6.8	151
Influenza and pneumonia (all forms)	2.8	63
All other causes	16.2	359
Total	100.0	2,214

mentioned. The next group of secondary causes was influenza and pneumonia, accounting for 13.7 percent, followed by mental disease and deficiency (9.1 percent).

Of the 2,214 deaths in which tuberculosis appears as a contributory cause, the most common primary cause was syphilis, accounting for 906 deaths (40.9 percent). Cancer was next in frequency with 563 deaths (25.4 percent). Accidents were third with 172 deaths (7.8 percent).

TREND OF TUBERCULOSIS MORTALITY

Many factors have contributed to the extraordinary achievements in the control of tuberculosis as reflected in the reduction of the death rate from around 200 per 100,000 at the beginning of the century to less than 45 per 100,000 at present. These factors are in the main the results of man's endeavor to control his environment. Some are tangible, such as the discovery of the causative organism and modes of transmission of the disease; many others are not so definite and may be stated vaguely to be the results of improvements in the "standard of living." The direct relationship of any one factor to the reduction of tuberculosis mortality may be difficult to prove and open to debate. The combination of all the factors, however, has reduced the mortality rate, in the course of half a century, to such an extent that the eradication of tuberculosis is within the realm of possibility. But it must be realized that it is at this point in the trend that the ratio of effort exerted to results achieved is highest. It is relatively easier, for example, to produce a 10-percent reduction from a high rate of 200 than it is to achieve a similar percentage reduction from a rate of 50. This statement is made only to emphasize that, in order to achieve the desired final results, even greater efforts will be required.

Table 7 and figure 6 present graphically the reduction in tuberculosis mortality from 1900 to 1941. It is rare to find a disease which shows a continuous, year-by-year decline such as is apparent in figure 6. With only minor exceptions (particularly that of 1918) the rate each year has been lower than the one preceding it. Actually the reduction has been even more gratifying than that shown in the figure, for during this period the population of the United States was continually aging. In addition, statistics are presented for the expanding Death Registration Area. The States that came into this Area in later years are also those having the higher tuberculosis mortality rates. The actual improvement in tuberculosis mortality is therefore even greater than that shown in the figure.

The decrease in tuberculosis mortality has been greater for females than for males. Between 1920 and 1940 there has been a 66-percent reduction in the mortality of females but only a 54-percent reduction

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TABLE 7.—*Death rates from tuberculosis (all forms): United States expanding Death Registration Area, 1900–41*

Year	Tuberculosis (all forms)		Year	Tuberculosis (all forms)	
	Deaths per 100,000	Number of deaths		Deaths per 100,000	Number of deaths
1941	44.4	59,251	1920	113.1	97,366
1940	45.9	60,428	1919	125.6	104,486
1939	47.1	61,609	1918	149.8	118,334
1938	49.1	63,735	1917	143.5	100,789
1937	53.8	69,324	1916	138.4	92,688
1936	55.9	71,527	1915	140.1	86,726
1935	55.1	70,080	1914	141.7	86,359
1934	56.7	71,609	1913	143.5	83,434
1933	59.6	74,842	1912	145.4	79,734
1932	62.5	74,267	1911	155.1	83,663
1931	67.8	80,129	1910	153.8	73,028
1930	71.1	83,352	1909	156.3	69,105
1929	75.3	86,885	1908	162.1	62,628
1928	78.3	89,007	1907	174.2	60,194
1927	79.6	85,194	1906	175.8	59,393
1926	85.5	88,740	1905	179.9	39,168
1925	84.8	86,510	1904	188.1	40,125
1924	87.9	87,346	1903	177.2	37,102
1923	91.7	88,788	1902	174.2	35,859
1922	95.3	88,385	1901	189.9	38,434
1921	97.6	85,739	1900	194.4	38,820

in that of males. In 1920 the rate for males (116.6) was only 6 percent higher than that for females (109.5), whereas in 1941 the mortality from tuberculosis for males (52.3) was 43 percent higher than that for females (36.5). It is of interest that the acceleration in the rate of decrease in mortality of females as compared to that of

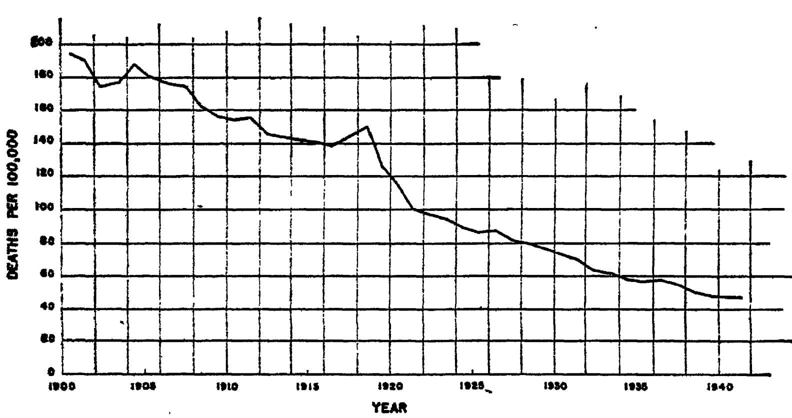

FIGURE 6.—Trend of mortality from tuberculosis (all forms): United States expanding Death Registration Area, 1900–41.

males began in the late twenties and continued through the decade of the thirties. The rate of decrease for males has been rather uniform during the 20-year period, whereas for females the rate of decrease paralleled that of males up to 1927 and from then on the reduction was at a much faster pace.

The reduction in tuberculosis mortality was experienced by other racial groups as well as by whites. However, the reduction was greater for whites than for nonwhites; between 1920 and 1940 there was a reduction of 63 percent among the white population and only a 51-percent decrease among nonwhites. The result is that while in 1920 the rate for nonwhites (262.4) was about two and one-half times as high as that of whites (99.5), in 1940 the rate for nonwhites (128.0) was three and one-half times that for whites (36.6). In the last decade, however, the rate of decrease among nonwhites (33 percent) was nearly the same as that among whites (37 percent). It was in the decade between 1920 and 1930 that the reduction was much more accelerated among whites (42 percent) than among nonwhites (27 percent).

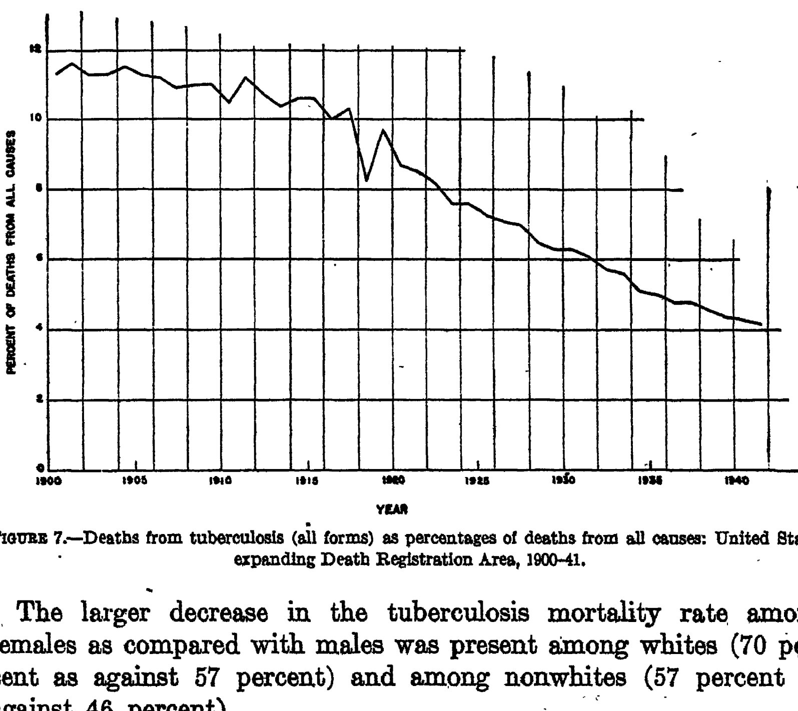

FIGURE 7.—Deaths from tuberculosis (all forms) as percentages of deaths from all causes: United States expanding Death Registration Area, 1900–41.

The larger decrease in the tuberculosis mortality rate among females as compared with males was present among whites (70 percent as against 57 percent) and among nonwhites (57 percent as against 46 percent).

That the reduction in tuberculosis mortality has been more accelerated than that of mortality from all causes is illustrated by figure 7 and table 8, which show the trend of tuberculosis deaths as percentages of deaths from all causes from 1900 to 1941. In 1900 more than 11 percent of all deaths were assigned to tuberculosis. The proportion of tuberculosis deaths decreased only slightly in the first 20 years, but since 1920 the decline has been rapid. In 1919 nearly 10 percent of all deaths were due to tuberculosis, in

TABLE 8.—*Deaths from tuberculosis (all forms) as percentages of deaths from all causes: United States expanding Death Registration Area, 1900–41*

Year	Deaths from tuberculosis as percentages of deaths from all causes	Number of deaths from all causes	Year	Deaths from tuberculosis as percentages of deaths from all causes	Number of deaths from all causes
1941	4.2	1,397,642	1920	8.7	1,118,070
1940	4.3	1,417,269	1919	9.7	1,072,263
1939	4.4	1,387,897	1918	8.3	1,430,079
1938	4.6	1,381,391	1917	10.3	981,239
1937	4.8	1,450,427	1916	10.0	924,971
1936	4.8	1,479,228	1915	10.6	815,500
1935	5.0	1,392,752	1914	10.6	810,914
1934	5.1	1,396,903	1913	10.4	802,909
1933	5.6	1,342,106	1912	10.7	745,771
1932	5.7	1,293,269	1911	11.2	749,918
1931	6.1	1,307,273	1910	10.5	696,856
1930	6.3	1,327,240	1909	11.0	630,057
1929	6.3	1,369,757	1908	11.0	567,245
1928	6.5	1,361,987	1907	10.9	550,245
1927	7.0	1,211,627	1906	11.2	531,005
1926	7.1	1,257,256	1905	11.3	345,863
1925	7.3	1,191,809	1904	11.5	349,855
1924	7.6	1,151,076	1903	11.3	327,295
1923	7.6	1,174,065	1902	11.3	318,636
1922	8.2	1,083,952	1901	11.6	332,203
1921	8.5	1,009,673	1900	11.3	343,217

1930 the percentage had dropped to 6.3, and by 1940 only 4.3 percent of all deaths were due to that cause.

The figure illustrates also that during a year of a great epidemic (1918) the index declined although tuberculosis mortality was higher in that year than in adjacent years.

Tuberculosis mortality decreased faster than mortality from all causes among both whites and nonwhites. Improvement in tuberculosis mortality relative to mortality from all causes, however, was more apparent among whites than among nonwhites. For example, among whites tuberculosis contributed 7.9 percent to the mortality from all causes in 1920, 5.4 percent in 1930, and 3.5 percent in 1940; the corresponding percentages among nonwhites were 14.8, 11.8, and 9.3, respectively.

There was practically no difference between the sexes in the improvement of tuberculosis mortality relative to mortality from all causes. The proportions which tuberculosis formed of deaths from all causes were nearly the same for both sexes in each of the three decades.

There have been great changes in terms of the place (rank) of tuberculosis among the leading causes of death since the beginning of the century. For both sexes, all races and all ages, tuberculosis was the first cause in numerical importance in 1900 and in 1910, third in 1920, and seventh in 1930 and in 1940. For nonwhites the rank of tuberculosis as a cause of death changed much less than for whites: it was second in numerical importance in 1920 and in 1930; and third in 1940. Among whites, tuberculosis was third in

rank as a cause of death for males in 1920 and seventh in 1930 and in 1940. Corresponding figures for females were fourth, sixth, and eighth, respectively.

The reduction in tuberculosis mortality occurred in both pulmonary and "other forms" of tuberculosis. The rate for pulmonary tuberculosis was 174.5 in 1900 and 40.8 in 1941. The corresponding figures for "other forms" of tuberculosis were 19.9 and 3.7, respectively. The reduction in the nonpulmonary forms to 1920 was not as continuous or regular as that in pulmonary tuberculosis. In fact, in the first decade of the century there was no reduction in the mortality from "other forms" of tuberculosis and only slight annual reductions up to 1920. In the last decade, however, the decrease in

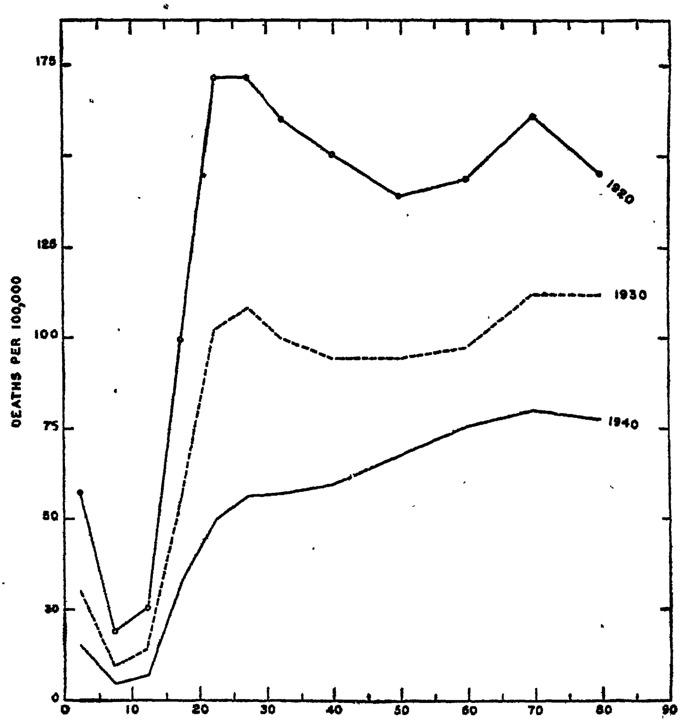

FIGURE 8.—Mortality from tuberculosis (all forms) by age for three decades: United States Death Registration Area. (Average annual death rates 1919–21, 1929–31, and 1939–41.)

nonpulmonary tuberculosis was much more rapid than that in tuberculosis of the respiratory system. Thus, the rate for the former was 8.1 in 1930 and 3.7 in 1941, a decrease of 54 percent. The corresponding figures for pulmonary tuberculosis were 63.0 and 40.8, a reduction of only 35 percent.

Trend of tuberculosis mortality by age.—Every age group shared in the reduction of the mortality rate. However, not all the age

groups benefited to the same degree. The differences in the relative reduction in the various age groups have resulted in a flattening out of the age-specific curve, particularly among white males, as may be seen from figure 8 and table 9, which show tuberculosis mortality rates by age in each of three decades (1919–21, 1929–31, 1939–41). The curves for the first two decades are peaked at ages 25–29. In the curve for 1940 the rate increased continuously with age, the highest rate being attained at old age. This is a result of the fact that the rate of reduction in tuberculosis mortality has not been

TABLE 9.—*Average annual death rates from tuberculosis (all forms) by age, sex, and race: United States Death Registration Area, 1919–21 and 1929–31*

Race	Sex	Age: Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55-64	65-74	75 and over	All ages
1929–31														
All races	Both sexes	29.9	9.7	13.4	55.3	102.3	108.1	99.9	93.5	93.6	97.0	111.8	111.4	71.4
	Male	31.6	9.9	9.9	40.1	84.8	99.7	104.5	112.3	120.6	122.9	129.9	117.6	76.3
	Female	28.2	9.5	16.9	70.5	119.1	116.3	95.3	73.7	64.1	68.9	93.0	105.8	66.3
White	Both sexes	23.7	6.6	7.9	35.5	73.4	80.9	79.0	77.8	82.4	90.4	107.2	107.2	58.1
	Male	25.1	6.8	6.2	24.7	57.9	74.1	81.8	95.0	108.6	115.6	123.6	111.5	63.4
	Female	22.3	6.4	9.6	46.2	88.5	87.6	76.1	59.5	53.9	63.5	90.2	103.3	52.5
Nonwhite	Both sexes	79.1	34.0	59.0	215.1	328.1	323.8	293.7	245.4	207.8	188.0	191.7	172.6	191.8
	Male	84.8	34.4	41.2	168.9	306.0	311.3	319.5	285.7	238.9	214.9	234.2	207.0	194.4
	Female	73.4	33.7	76.7	257.8	347.6	335.3	269.0	205.9	171.6	153.1	143.6	141.4	189.2
1919–21														
All races	Both sexes	57.1	18.3	25.7	99.1	170.8	171.0	159.8	150.1	138.3	143.0	160.8	144.8	113.1
	Male	60.6	18.2	18.3	74.5	151.0	162.6	163.7	170.1	169.6	175.5	182.9	150.2	118.0
	Female	53.5	18.3	33.3	123.3	189.5	179.4	155.6	128.3	102.6	107.1	137.9	140.1	108.0
White	Both sexes	51.8	14.6	18.4	75.8	136.9	144.9	140.6	134.5	127.0	135.8	154.6	139.0	99.0
	Male	55.4	14.9	13.5	55.4	119.3	139.0	146.1	154.7	158.5	167.5	175.0	142.1	105.1
	Female	48.2	14.3	23.4	96.0	153.8	150.9	134.8	112.6	91.5	101.2	133.5	136.2	92.6
Nonwhite	Both sexes	113.8	54.6	94.2	319.6	487.8	450.1	393.5	322.5	277.3	264.8	267.6	239.6	268.3
	Male	118.0	51.8	63.9	262.1	461.3	430.6	389.1	342.7	294.2	300.3	309.1	275.5	261.0
	Female	109.6	57.4	124.3	372.5	511.1	467.6	397.7	300.9	254.1	218.1	218.4	205.3	275.8

uniform at all ages. In general, the percentage reduction was nearly twice as high in the younger as in the older age groups. For whites the decrease between 1920 and 1940 was approximately 80 percent in the age group under 20, around 70 percent at ages 20–44, and less than 50 percent in the older age groups. The same is true when the 1940 rates are compared with those of 1930: the decrease was approximately 55 percent in the younger ages, 45 percent at ages 20–44, and 25 percent in the older ages. Although not so pronounced as in the case of whites, a similar differential by age in the rate of decrease is also noticed among nonwhites. For nonwhites, however, the curve for 1940 still exhibits a peak at ages 20–29.

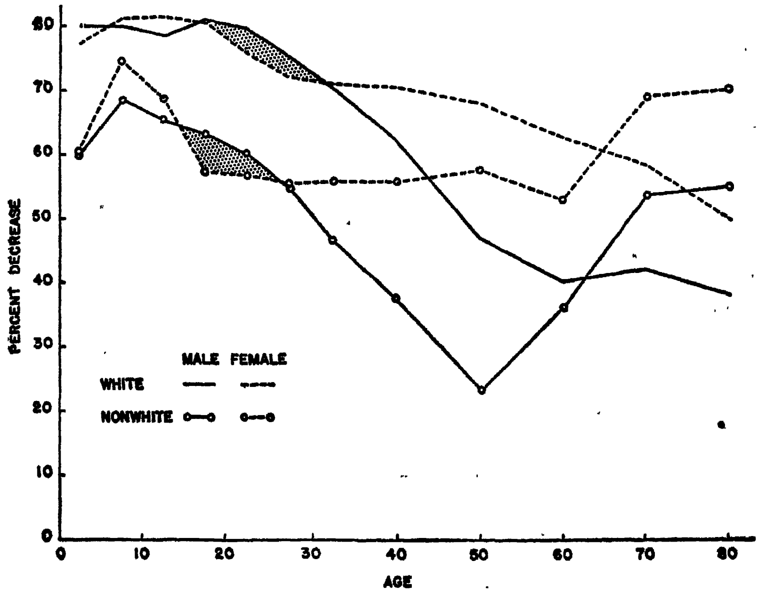

FIGURE 9.—Percentage decrease in the mortality rate from tuberculosis (all forms) by age, sex, and race: 1939-41 compared with 1919-21.

TABLE 10.—*Percentage decrease in the mortality rate from tuberculosis (all forms) by age, sex, and race: 1939-41 compared with 1929-31 and with 1919-21, United States Death Registration Area*

Race	Sex	Age: Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55-64	65-74	75 and over	All ages
1939-41 COMPARED WITH 1929-31														
All races	Both sexes	48.8	54.6	49.3	50.3	51.7	48.0	43.2	36.7	28.5	22.4	28.4	30.3	35.7
	Male	50.9	53.5	47.5	50.1	52.2	48.8	42.7	33.9	20.3	12.9	19.6	23.9	29.8
	Female	46.5	55.8	49.7	50.4	51.4	47.4	43.8	40.2	43.7	38.9	39.8	36.5	42.5
White	Both sexes	53.6	57.6	54.4	58.6	58.0	52.2	47.3	40.6	30.1	22.9	27.3	28.4	37.0
	Male	55.8	55.9	53.2	56.7	58.2	53.3	46.6	38.1	22.5	13.1	18.1	21.8	30.1
	Female	51.1	57.8	55.2	59.1	58.1	51.3	48.2	43.5	45.3	40.5	38.9	34.6	45.1
Nonwhite	Both sexes	42.4	54.4	48.1	39.8	37.9	37.6	34.9	29.7	18.9	20.1	44.4	47.5	33.6
	Male	43.9	52.3	45.9	42.5	39.7	37.2	34.6	25.2	5.5	10.5	39.0	40.0	29.4
	Female	40.5	56.7	49.2	38.1	36.7	38.1	34.7	35.3	36.9	32.9	52.9	57.1	37.7
1939-41 COMPARED WITH 1919-21														
All races	Both sexes	73.2	76.0	73.5	72.3	71.1	67.1	64.5	60.6	51.6	47.3	50.2	46.4	59.4
	Male	74.4	74.7	71.6	73.2	73.2	68.6	63.4	56.4	43.3	39.0	42.9	40.4	54.6
	Female	71.8	77.0	74.5	71.6	69.4	65.9	65.6	65.6	64.8	60.7	59.4	52.0	64.7
White	Both sexes	78.8	80.8	80.4	80.6	77.5	73.3	70.4	65.7	54.6	48.7	49.6	44.7	63.0
	Male	80.0	79.9	78.5	80.7	79.7	75.1	70.1	62.0	46.9	40.1	42.2	38.6	57.8
	Female	77.4	81.1	81.6	80.3	75.9	71.7	70.8	70.2	67.8	62.6	58.7	50.4	68.9
Nonwhite	Both sexes	59.9	71.6	67.5	59.5	58.3	55.1	51.3	46.5	39.2	43.2	60.2	62.2	52.5
	Male	59.7	68.3	65.1	63.0	60.0	54.6	46.3	37.7	23.3	36.0	53.8	55.1	47.4
	Female	60.1	74.6	68.6	57.1	56.9	55.6	55.8	55.7	57.4	52.9	69.0	70.5	57.3

The relative decrease in the mortality rate was much greater for females than for males in the older age groups. However, during the most fertile age period (15–29 years of age) the percentage decrease was smaller for females than for males. This is true for both whites and nonwhites as may be seen from figure 9 and table 10. For nonwhites the period when the reduction among males was higher than among females is 5 years earlier than among whites. This may suggest that this phenomenon is associated with childbearing, since nonwhite females generally begin bearing children earlier than the white.

The differences in percentage decrease of tuberculosis mortality rates by age and sex, in addition to the changing age composition of the population, result in differences in the percentage distribution of tuberculosis deaths by age in the three decades. The detailed data on percent of tuberculosis deaths for the three decades by age, sex, and race are shown in table 11. The data (all races, both sexes) are illustrated in figure 10. It is seen that relatively fewer deaths in the later than in the earlier decades are concentrated in the younger age groups and more deaths occur in the older age groups. The biggest relative change occurred in the age group 45–64. In this age group occurred

TABLE 11.—*Percentage distribution of deaths from tuberculosis (all forms) by age, sex, and race: United States Death Registration Area, 1939–41, 1929–31, and 1919–21*

(Tuberculosis deaths in each age-sex group shown as percentage of all tuberculosis deaths in each racial group)

Age	All races			White			Nonwhite		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Under 20	10.4	4.3	6.0	7.6	3.2	4.3	17.5	7.1	10.4
20–44	47.3	24.7	22.6	42.6	22.6	20.0	59.3	30.0	29.3
45–64	30.3	22.2	8.1	34.8	25.8	8.9	19.2	13.1	6.0
65 and over	11.8	7.3	4.5	15.0	9.2	5.8	3.8	2.6	1.2
All ages	100.0	58.6	41.4	100.0	60.9	39.1	100.0	53.0	47.0
				1929–31					
Under 20	14.4	6.1	8.2	11.8	5.1	6.7	21.3	8.9	12.4
20–44	53.5	27.4	26.1	51.0	26.4	24.6	60.4	30.2	30.2
45–64	23.4	15.6	7.8	26.5	17.9	8.6	15.0	9.4	5.6
65 and over	8.6	4.9	3.7	10.6	5.9	4.6	3.1	1.9	1.1
All ages	100.0	54.1	45.9	100.0	55.4	44.6	100.0	50.5	49.5
				1919–21					
Under 20	16.9	7.4	9.5	15.4	6.8	8.6	22.7	9.5	13.3
20–44	55.5	28.4	27.1	54.4	28.3	26.1	59.9	28.9	31.0
45–64	20.7	13.5	7.3	22.5	14.7	7.8	13.8	8.6	5.2
65 and over	6.7	3.7	3.0	7.6	4.2	3.4	3.2	1.9	1.3
All ages	100.0	53.1	46.9	100.0	54.1	45.9	100.0	49.1	50.9

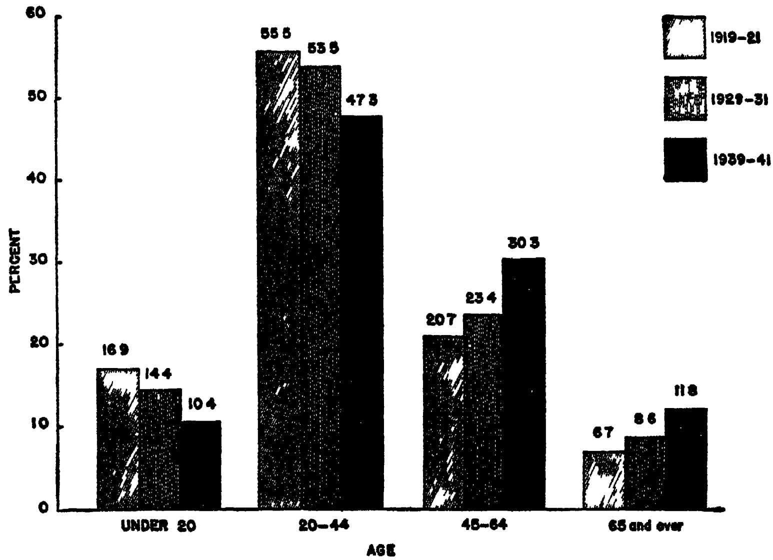

FIGURE 10 —Percentage distribution of deaths from tuberculosis (all forms) in broad age groups United States Death Registration Area, 1919-21, 1929-31, and 1939-41

20 7 percent of all tuberculosis deaths in 1920 and 30 3 percent in 1940. On the other hand, while one-sixth of all tuberculosis deaths in 1920 were of persons under 20 years of age, in 1940 only one-tenth of the deaths occurred in that age group The change is consistent and gradual for the three decades and is in the same general direction in each of the two sexes and of the two races, as may be seen from table 11.

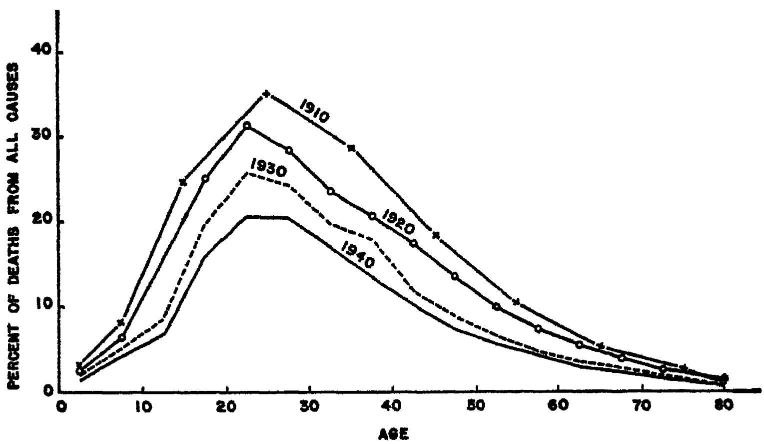

FIGURE 11 —Deaths from tuberculosis (all forms) as percentages of deaths from all causes by age for four decades United States Death Registration Area (Death rates for 1910, and average annual death rates for 1919-21, 1929-31, and 1939-41)

TABLE 12.—*Deaths from tuberculosis (all forms) as percentages of deaths from all causes, by age: United States Death Registration Area, 1919–21, 1929–31, and 1939–41*

Age	Percent of deaths from all causes			Deaths from all causes (average annual number)		
	1939–41	1929–31	1919–21	1939–41	1929–31	1919–21
Under 5	1.2	1.7	2.3	136,549	190,357	229,489
5–9	4.1	5.0	6.2	11,610	22,970	26,219
10–14	6.8	8.6	11.3	11,748	17,722	18,812
15–19	15.9	19.8	25.0	21,325	30,636	29,419
20–24	20.5	25.6	31.2	27,919	41,076	40,749
25–29	20.3	24.3	28.3	30,707	41,512	45,726
30–34	16.9	19.8	23.5	34,457	43,759	45,505
35–39	13.2	15.3	20.3	41,781	53,496	48,238
40–44	10.0	11.8	17.2	53,514	60,850	45,248
45–49	7.4	8.9	13.5	71,381	70,784	49,935
50–54	5.5	6.5	9.8	91,990	82,678	52,218
55–59	4.0	4.7	7.2	107,442	90,668	58,835
60–64	2.9	3.4	5.3	125,220	105,032	69,657
65–69	2.1	2.6	3.8	147,100	115,385	73,158
70–74	1.4	1.8	2.5	153,243	122,058	75,679
75 and over	.6	.8	1.1	333,643	243,849	161,138
All ages	4.3	6.3	9.0	1,400,936	1,334,757	1,074,726

The changes that occurred in tuberculosis relative to total mortality by age are shown in figure 11 and table 12, which present the percentages of tuberculosis deaths to deaths from all causes by age in the three decades, 1919–21, 1929–31, and 1939–41. The curve for each decade lies entirely below that of the preceding one, indicating that for each age group tuberculosis formed a smaller proportion of total deaths in 1940 than in 1930 and that of the latter in turn was smaller than that for 1920. For example, at ages 20–24 nearly one-third of all deaths were due to tuberculosis in the first of the three decades but only one-fourth of the deaths in 1930 and only one-fifth of the deaths at these ages in 1940 were due to tuberculosis. The relative decrease was greatest for the youngest age groups and least for the age group 25–34. It is also worthy of note that the curve for the latest decade is not as sharply peaked at ages 20–24 as are the curves for the earlier decades.

It is of interest to consider what the improvements in the age-specific mortality rates mean in actual number of lives saved annually. For example, if the age-specific mortality rates of 1920 were operative today, there would have been 156,520 deaths from tuberculosis in 1940, compared with the actual number of 60,428, a saving of close to 100,000 lives annually.

SUMMARY

This paper presents analyses of the most recent material available on tuberculosis mortality in the United States, and records the following findings:

The average annual number of deaths from tuberculosis (all forms) in the period 1939–41 was 60,429 (45.9 per 100,000 of the enumerated

population). Mortality from tuberculosis was 41 percent higher among males than among females, and three and one-half times as high among nonwhites as among whites.

Death rates from tuberculosis (all forms) are higher in the older age groups than in the younger. Among children and young adults the rates are higher for females than for males but in the older groups the rates are much higher for males. Among whites the rates increase with age but among nonwhites the highest rates occur during the most productive age periods.

Nearly one-half of all tuberculosis deaths occur at ages 20–44. From early adulthood to age 35 tuberculosis is the leading cause of death. It is one of the first three causes of death at ages 15–49. For ages 20–34 one out of every six deaths among whites and one out of every three deaths among nonwhites is due to tuberculosis.

The death rate from tuberculosis (all forms) for males is higher among residents of larger cities than among residents of intermediate-sized cities and that of the latter in turn is much higher than the rate for residents of rural areas. For females the variation of the death rate by size of city is almost negligible.

The death rate for tuberculous meningitis decreases continuously with age, while that for pulmonary tuberculosis and for "other forms" of tuberculosis increases with age.

Twenty-three percent of the tuberculosis death certificates listed secondary causes. Diseases of the heart is the most common contributory cause. Syphilis is the most common cause to which tuberculosis is secondary.

Tuberculosis mortality has decreased continuously since the beginning of the century; the rate in 1941 was less than one-fourth that in 1900. The decrease has been relatively greater for females than for males, and for whites than for nonwhites.

Tuberculosis mortality has fallen at a more accelerated rate than mortality from all causes; in 1900 more than 11 percent of all deaths were due to tuberculosis, in 1940 the percentage was only 4.3. Tuberculosis was first in numerical importance as a cause of death at the beginning of the century and seventh in 1940.

Every age group shared in the reduction of the mortality rate, but not to the same degree. In general the percentage reduction was nearly twice as high in the younger groups as it was in the older ones. The relative decrease was higher for females than for males in the older groups but during the most fertile age period the percentage decrease was smaller for females than for males.

The improvement in age-specific mortality rates from 1920 to 1940 is equivalent to the saving of nearly 100,000 lives annually.

The curve representing tuberculosis mortality relative to total mortality (tuberculosis deaths as a percentage of deaths from all

causes) by age, sex, and race is presented. It is suggested that this index, the best available measure of changes in tuberculosis mortality, will serve as an indicator of the course of the disease, particularly in critical areas during wartime.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

August 15–September 11, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended September 11, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The number of cases of poliomyelitis rose from 1,686 during the 4 weeks ended August 14 to 3,482 during the 4 weeks ended September 11. The number of cases was more than 4 times that reported during the corresponding period in 1942 and more than 2 times the 1938–42 median. For the country as a whole the incidence is the highest reported for this period since 1935, when the reported cases totaled 3,625.

A comparison of geographic regions shows an increase over the median in each region except the South Atlantic and East South Central; the number of cases for the current period ranged from 1.4 times the median in the Middle Atlantic region to almost 12 times the median in the Pacific region. States that have reported the largest number of cases are: Illinois, 692; California, 520; Kansas, 279; Texas, 239; New York, 210; Connecticut, 155; Utah, 145; Oklahoma, 127; and Colorado, 96 cases. More than 70 percent of the cases occurred in these 9 States which are widely distributed over the whole country.

While the number of cases for the 4-week period was much larger than that for the preceding 4-week period, there was a decline during the last week of the current period in practically all of the States in which the disease has been most prevalent, as well as in other States that have had minor excesses. In preceding years the peak of this disease has usually been reached during this period of the year, so a further decline in the number of cases may normally be expected.

Influenza.—A total of 2,233 cases of influenza was reported during the current period, the number being about 15 percent above the 1942

incidence and more than 35 percent above the 1938–42 median for the corresponding period. The increase was largely due to a relatively large number of cases in the West South Central and Mountain regions. States reporting the largest numbers of cases were: Texas, 924; South Carolina, 541; Virginia, 212; and Arizona, 117 cases.

Measles.—The number of cases (4,429) of measles reported for the 4 weeks ended September 11 was approximately 60 percent above the 1938–42 median level. In the New England and East South Central regions the incidence was about normal, but all other regions reported excesses over the normal seasonal expectancy; the largest excess occurred in the East North Central region where the number of cases (1,497) was almost 3 times the median.

Number of reported cases of nine communicable diseases in the United States during the 4-week period August 15–September 11, 1943, the number for the corresponding period in 1942, and the median number of cases reported for the corresponding period, 1938–42

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	957	951	964	2,283	1,974	1,658	4,429	2,605	2,819
New England	12	12	14	8	18	4	343	423	349
Middle Atlantic	56	51	68	11	32	29	971	381	684
East North Central	113	114	114	84	95	95	1,497	456	545
West North Central	86	57	90	39	34	35	267	193	184
South Atlantic	265	344	344	816	859	831	337	139	191
East South Central	152	135	187	69	102	102	115	83	118
West South Central	128	150	154	986	563	513	219	106	121
Mountain	48	40	52	154	204	107	228	217	184
Pacific	97	48	48	71	72	67	452	607	380
	Meningococcus meningitis			Poliomyelitis [3]			Scarlet fever		
United States	650	187	122	3,482	847	1,648	3,255	2,740	2,740
New England	69	16	7	265	83	30	329	298	161
Middle Atlantic	169	55	23	258	181	181	423	421	453
East North Central	127	19	18	907	261	336	730	652	766
West North Central	46	14	11	570	106	111	283	283	265
South Atlantic	83	42	23	35	74	130	482	367	329
East South Central	32	15	15	75	80	80	217	350	269
West South Central	29	9	9	392	49	49	105	113	126
Mountain	17	4	4	306	18	27	385	89	114
Pacific	78	13	6	674	45	57	301	167	223
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	11	16	36	759	887	1,655	11,056	11,672	11,672
New England	0	0	0	39	34	35	503	1,233	765
Middle Atlantic	0	0	0	94	130	148	2,140	2,988	2,988
East North Central	8	3	10	93	102	158	3,260	4,025	3,793
West North Central	0	4	13	55	59	88	904	519	536
South Atlantic	0	1	2	150	188	345	1,725	939	1,297
East South Central	2	1	1	129	142	256	407	408	442
West South Central	1	3	3	149	168	434	692	527	631
Mountain	0	3	6	20	43	51	554	330	406
Pacific	0	1	2	30	21	52	871	703	740

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.

[2] Mississippi excluded.

[3] *Correction:* For the 4 weeks ended July 17 there were 867 cases of poliomyelitis reported, distributed as follows: New England, 10; Middle Atlantic, 33; East North Central, 14; West North Central, 29; South Atlantic, 11; East South Central, 15; West South Central, 443; Mountain, 29, and Pacific, 283. The number of cases was about 3.7 times the 1942 figure for this period and almost 3 times the 1938–42 median.

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 826 during the preceding 4-week period to 650 during the current 4 weeks. The incidence was, however, more than 3 times that recorded for the corresponding period in 1942 and more than 5 times the 1938–42 median. Each region of the country has contributed to the relatively high incidence of this disease. The largest excess over the median was reported from the Pacific region and the smallest from the East South Central region. For the country as a whole the incidence still continues to maintain the highest level in the 15 years for which these data are available.

Scarlet fever.—During the current 4-week period there were 3,255 cases of scarlet fever reported, an increase of approximately 20 percent over the 1938–42 median incidence for this period. The Middle Atlantic, East North Central, and South Central regions reported fewer cases than have normally occurred in those regions, but in the other 5 regions the incidence was relatively high.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended September 11 there were 957 cases of diphtheria reported, as compared with 951 for the corresponding period in 1942 and a 1938–42 median of 964 cases. In the Pacific region the number of cases (97) was about twice the median, but in all other regions the number of cases either closely approximated the median or fell considerably below it.

Smallpox.—The incidence of smallpox continued at a relatively low level, only 11 cases being reported for the current period, which was less than one-third of the 1938–42 median. Seven of the cases were reported from Illinois. For the country as a whole the incidence is the lowest on record for this period.

Typhoid and paratyphoid fever.—For the current period the number of reported cases of this disease totaled 759, which was about 85 percent of the number reported for the corresponding period in 1942 and less than 50 percent of the 1938–42 median. In the New England region the incidence stood at about the normal seasonal level, but in all other regions the incidence was comparatively low.

Whooping cough.—The number of cases (11,056) of whooping cough reported during the current period was only slightly below the seasonal expectancy. Of the nine geographic regions, five reported an increase over the 1938–42 median and in four regions the number of cases was below the normal seasonal expectancy. The largest increase was reported from the South Atlantic region while the most significant decreases were reported from the Middle Atlantic and East North Central regions.

MORTALITY, ALL CAUSES

For the four weeks ended September 11 there were approximately 30,000 deaths reported by the group of large cities to the Bureau of the Census. The number represented an increase of almost 5 percent over the average number of deaths for the corresponding weeks in the 3 preceding years.

The monthly death rate from all causes among persons insured in the industrial department of the Metropolitan Life Insurance Co. has been above the corresponding month of the preceding year for every month from October 1942 to July 1943, the latest available data. The average of the excesses in the rates for these 10 months over the corresponding months of the preceding year was about 9 percent.

DEATHS DURING WEEK ENDED SEPTEMBER 18, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 18, 1943	Corresponding week, 1942
Data from 90 large cities of the United States:		
Total deaths	7,927	7,831
Average for 3 prior years	7,628	
Total deaths, first 37 weeks of year	338,980	311,115
Deaths under 1 year of age	548	620
Average for 3 prior years	556	
Deaths under 1 year of age, first 37 weeks of year	24,249	21,118
Data from industrial insurance companies:		
Policies in force	65,822,142	65,022,250
Number of death claims	10,197	10,201
Death claims per 1,000 policies in force, annual rate	8.1	8.2
Death claims per 1,000 policies, first 37 weeks of year, annual rate	9.8	9.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 25, 1943

Summary

The incidence of poliomyelitis declined from a total of 1,020 cases to 818, the smallest number reported in the past 5 weeks. Decreases were reported in all geographic areas, although some States recorded increases. The accumulated total for the first 38 weeks of the year is 8,630. The 5-year (1938–42) medians corresponding with the current and cumulative figures are, respectively, 484 and 4,430. States reporting 18 or more cases currently (last week's figures in parentheses) are as follows: *Increases*—Wisconsin 22 (18), Minnesota 23 (10), Utah 42 (41), Oregon 18 (14); *decreases*—Massachusetts 29 (35), Connecticut 29 (32), New York 57 (65), Illinois 140 (208), Michigan 28 (29), Kansas 52 (77), Oklahoma 18 (26), Texas 41 (57), Colorado 28 (35), Washington 22 (27), and California 117 (150). Rhode Island reported 20 cases, the same number as for the preceding week.

A total of 178 cases of meningitis was reported, as compared with 135 last week and a 5-year median of 31. States reporting more than 5 cases (last week's figures in parentheses) are as follows: Massachusetts 16 (10), New York 17 (12), Pennsylvania 15 (10), Illinois 19 (8), Michigan 8 (9), Maryland 8 (1), Washington 8 (2), Oregon 9 (3), and California 14 (9).

Cumulative figures for the first 38 weeks of the year for other diseases included in the table (figures for the corresponding period of last year in parentheses) are as follows: Anthrax 48 (63), diphtheria 8,671 (8,926), dysentery, all forms, 17,033 (15,450), encephalitis, infectious, 540 (420), influenza 84,920 (83,811), leprosy 19 (35), measles 541,518 (469,401), Rocky Mountain spotted fever 410 (427), scarlet fever 102,603 (93,331), smallpox 625 (639), tularemia 651 (709), typhoid and paratyphoid fever 4,184 (5,137), typhus fever, endemic, 2,946 (2,511), whooping cough 143,326 (136,936).

A total of 8,300 deaths was recorded in 90 large cities of the United States, as compared with 7,927 last week and a 3-year (1940–42) average of 7,563. The cumulative total for the first 38 weeks of the year is 347,280, as compared with 318,842 for the corresponding period of last year.

Telegraphic morbidity reports from State health officers for the week ended September 25, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria: Week ended Sept. 25, 1943	Diphtheria: Week ended Sept. 26, 1942	Diphtheria: Median 1938–42	Influenza: Week ended Sept. 25, 1943	Influenza: Week ended Sept. 26, 1942	Influenza: Median 1938–42	Measles: Week ended Sept. 25, 1943	Measles: Week ended Sept. 26, 1942	Measles: Median 1938–42	Meningitis, meningococcus: Week ended Sept. 25, 1943	Meningitis, meningococcus: Week ended Sept. 26, 1942	Meningitis, meningococcus: Median 1938–42
NEW ENGLAND												
Maine	0	0	0	1	-----	-----	20	3	10	3	1	0
New Hampshire	1	0	0	-----	-----	-----	5	0	0	1	1	0
Vermont	0	0	0	-----	-----	-----	2	11	1	0	0	0
Massachusetts	4	4	4	-----	-----	-----	31	35	27	16	3	2
Rhode Island	0	5	0	-----	-----	-----	18	1	0	2	0	0
Connecticut	1	2	1	3	5	1	10	5	5	5	0	0
MIDDLE ATLANTIC												
New York	10	5	7	[1] 3	[1] 6	[1] 3	43	30	48	17	5	3
New Jersey	1	0	3	1	3	3	34	44	26	5	1	0
Pennsylvania	8	7	11	2	-----	-----	25	24	24	15	1	3
EAST NORTH CENTRAL												
Ohio	5	3	8	4	3	3	27	19	6	5	1	0
Indiana	11	9	13	4	16	15	10	10	8	2	0	1
Illinois	6	15	16	1	5	5	19	19	19	19	2	1
Michigan [2]	6	0	1	-----	2	2	110	18	22	8	2	0
Wisconsin	2	0	0	12	14	28	82	25	34	2	0	0
WEST NORTH CENTRAL												
Minnesota	8	2	4	-----	-----	-----	36	6	9	3	1	0
Iowa	11	6	2	1	-----	-----	8	10	5	2	0	0
Missouri	8	9	11	2	1	1	0	8	6	8	1	1
North Dakota	2	0	1	-----	1	1	41	0	2	0	0	0
South Dakota	1	4	4	-----	-----	-----	0	0	1	0	0	0
Nebraska	5	8	4	3	2	-----	1	15	8	0	1	1
Kansas	3	1	3	1	4	1	3	1	4	1	1	1
SOUTH ATLANTIC												
Delaware	0	1	0	-----	-----	-----	1	0	2	2	0	0
Maryland [2]	4	8	8	-----	4	2	7	2	5	8	2	1
District of Columbia	0	1	1	-----	-----	-----	0	1	1	1	0	0
Virginia	12	16	23	63	74	58	11	3	6	2	3	2
West Virginia	6	9	9	3	1	2	8	2	2	1	2	1
North Carolina	37	47	53	-----	-----	-----	7	4	12	4	0	0
South Carolina	16	27	36	146	210	157	8	5	3	1	1	1
Georgia	26	51	41	6	2	8	2	6	6	0	0	0
Florida	6	7	8	5	1	1	2	2	2	0	0	0
EAST SOUTH CENTRAL												
Kentucky	10	11	14	1	2	2	1	4	4	2	0	0
Tennessee	25	13	15	16	12	17	8	2	10	4	0	2
Alabama	18	28	28	23	15	20	4	11	7	4	2	0
Mississippi [2]	5	7	15	-----	-----	-----	-----	-----	-----	0	1	1
WEST SOUTH CENTRAL												
Arkansas	4	17	15	12	8	9	2	0	2	0	0	0
Louisiana	5	10	10	1	1	2	4	5	3	1	1	0
Oklahoma	5	8	10	17	9	10	0	2	2	1	1	0
Texas	25	36	33	442	231	102	15	9	9	4	1	0
MOUNTAIN												
Montana	5	1	1	-----	1	2	17	3	5	0	0	0
Idaho	0	0	0	-----	-----	-----	4	5	4	0	0	0
Wyoming	0	0	2	2	30	-----	12	7	2	0	0	0
Colorado	5	1	6	50	24	8	13	5	6	2	0	0
New Mexico	1	1	1	-----	2	-----	3	1	1	0	0	0
Arizona	3	1	1	28	25	30	2	8	8	1	0	0
Utah [3]	0	0	0	-----	-----	3	5	36	2	0	0	0
Nevada	0	0	-----	-----	-----	-----	0	0	-----	0	1	-----
PACIFIC												
Washington	5	1	2	1	2	-----	9	42	11	8	1	1
Oregon	3	0	2	3	2	6	11	26	18	9	0	0
California	12	18	13	12	28	11	35	49	51	14	2	1
Total	326	385	395	869	746	674	711	524	626	178	39	31
38 weeks	8,638	8,926	10,043	84,920	83,811	153,627	541,518	469,401	469,401	14,331	2,623	1,574

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 25, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Sept. 25, 1943	Sept. 26, 1942		Sept. 25, 1943	Sept. 26, 1942		Sept. 25, 1943	Sept. 26, 1942		Sept. 25, 1943	Sept. 26, 1942	
NEW ENGLAND												
Maine	1	2	0	10	7	2	0	0	0	1	0	0
New Hampshire	2	0	0	2	5	3	0	0	0	0	0	0
Vermont	4	2	2	0	3	3	0	0	0	0	0	0
Massachusetts	29	1	1	97	75	40	0	0	0	11	13	1
Rhode Island	20	0	0	4	4	1	0	0	0	0	0	0
Connecticut	29	4	4	11	7	11	0	0	0	2	1	1
MIDDLE ATLANTIC												
New York	57	22	22	109	85	74	0	0	0	7	11	18
New Jersey	12	17	17	19	33	26	0	0	0	2	1	5
Pennsylvania	14	8	11	85	72	87	0	0	0	18	9	17
EAST NORTH CENTRAL												
Ohio	7	13	13	113	79	79	1	0	0	8	9	12
Indiana	10	8	3	32	28	28	0	1	1	5	6	6
Illinois	140	50	25	59	61	93	3	0	0	5	12	16
Michigan [2]	28	13	20	58	44	84	0	0	0	9	0	10
Wisconsin	22	2	6	73	49	49	1	0	0	1	4	2
WEST NORTH CENTRAL												
Minnesota	23	5	16	29	26	32	0	0	1	1	0	4
Iowa	16	8	3	51	34	28	0	0	1	1	3	3
Missouri	10	1	3	29	12	18	0	0	0	4	14	13
North Dakota	1	2	0	3	4	6	0	0	0	0	0	0
South Dakota	2	0	0	14	11	9	0	0	0	0	0	0
Nebraska	10	10	1	10	7	7	0	0	0	0	0	1
Kansas	52	11	5	64	12	35	0	0	0	0	0	6
SOUTH ATLANTIC												
Delaware	2	1	0	1	1	4	0	0	0	0	1	1
Maryland [2]	3	2	2	16	14	14	0	0	0	4	8	6
District of Columbia	1	1	2	5	14	5	0	0	0	2	1	1
Virginia	2	4	4	28	38	20	0	0	0	11	10	11
West Virginia	8	6	2	60	37	34	0	0	0	2	9	11
North Carolina	1	1	8	90	62	62	0	0	0	4	6	10
South Carolina	0	2	2	6	8	8	0	0	0	4	5	11
Georgia	0	1	1	19	87	23	0	0	0	3	12	15
Florida	2	2	2	4	2	8	0	0	0	1	1	1
EAST SOUTH CENTRAL												
Kentucky	5	2	7	19	28	28	0	1	0	9	4	18
Tennessee	0	6	3	31	45	44	0	0	0	9	11	16
Alabama	1	3	3	18	36	26	0	0	0	4	4	8
Mississippi [2]	0	0	1	3	3	5	0	0	0	3	6	6
WEST SOUTH CENTRAL												
Arkansas	4	5	1	3	7	7	0	2	0	2	11	15
Louisiana	4	1	1	5	3	4	0	0	0	7	9	17
Oklahoma	18	0	2	5	12	9	0	0	0	7	7	11
Texas	41	1	1	20	17	17	1	0	0	8	17	43
MOUNTAIN												
Montana	2	0	1	5	5	8	0	0	0	0	0	1
Idaho	4	0	0	0	5	5	0	0	0	2	0	2
Wyoming	1	0	0	4	1	1	0	0	0	0	1	1
Colorado	28	4	4	10	5	18	0	1	1	6	8	7
New Mexico	3	2	1	3	3	4	0	0	0	4	1	4
Arizona	4	1	1	2	0	2	0	0	0	3	0	1
Utah [2]	42	0	2	12	4	2	0	0	0	1	0	1
Nevada	1	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	22	2	2	27	19	11	0	0	0	1	6	6
Oregon	18	0	3	16	5	6	0	0	0	0	1	1
California	117	4	9	79	41	66	0	0	0	4	1	8
Total	818	220	484	1,363	1,110	1,216	6	5	9	176	218	422
38 weeks	8,630	2,618	4,430	102,603	95,331	121,178	625	639	2,011	4,184	5,137	7,058

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 25, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended Sept. 25, 1943	Whooping cough: Week ended Sept. 26, 1942	Whooping cough: Median 1938–42	Week ended Sept. 25, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	14	50	15	0	0	0	0	0	0	0	0	0
New Hampshire	2	5	3	0	0	0	0	0	0	0	0	0
Vermont	17	26	16	0	0	0	0	0	0	0	0	0
Massachusetts	64	194	123	0	0	3	0	2	0	0	0	0
Rhode Island	129	32	13	0	0	0	0	0	0	0	0	0
Connecticut	25	55	54	0	2	4	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	266	351	351	0	1	177	0	0	0	0	1	1
New Jersey	120	168	153	0	0	0	0	0	0	0	0	0
Pennsylvania	133	205	261	1	0	1	0	1	0	0	0	0
EAST NORTH CENTRAL												
Ohio	178	220	220	0	0	0	0	0	0	0	0	0
Indiana	51	18	18	0	2	0	0	0	0	0	1	0
Illinois	146	226	214	0	2	2	0	0	0	0	0	0
Michigan [3]	191	311	291	0	0	15	0	1	0	0	0	0
Wisconsin	204	199	199	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	36	49	49	0	2	0	0	0	0	0	0	0
Iowa	16	37	21	0	0	0	0	0	0	0	0	0
Missouri	16	6	25	0	0	0	2	0	0	0	0	0
North Dakota	31	15	10	0	0	0	0	0	0	0	0	0
South Dakota	5	0	3	0	0	0	0	0	0	0	0	0
Nebraska	2	8	8	0	0	0	0	0	0	0	0	0
Kansas	10	33	33	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	2	2	2	0	0	0	0	0	0	0	0	0
Maryland [2]	69	70	69	0	0	0	4	0	0	1	0	0
District of Columbia	19	17	13	0	0	0	0	0	0	0	0	0
Virginia	54	84	34	0	0	0	150	0	0	0	1	1
West Virginia	22	6	24	0	0	0	0	0	0	1	0	0
North Carolina	50	45	60	0	0	0	0	0	0	0	1	2
South Carolina	52	37	37	0	0	4	0	0	0	0	0	8
Georgia	7	16	10	0	0	5	0	0	0	1	1	45
Florida	16	6	6	0	2	0	1	0	0	0	0	6
EAST SOUTH CENTRAL												
Kentucky	31	40	58	0	0	13	0	0	0	0	0	0
Tennessee	36	13	24	0	0	0	5	0	0	1	1	4
Alabama	24	33	14	0	0	0	0	0	0	0	0	26
Mississippi [2]	-------	-------	-------	0	0	0	0	0	0	0	1	3
WEST SOUTH CENTRAL												
Arkansas	13	10	10	0	10	12	0	0	0	0	1	1
Louisiana	13	0	5	0	2	2	0	0	0	0	0	14
Oklahoma	9	2	3	0	0	0	0	0	0	0	0	0
Texas	156	68	74	0	20	184	0	0	0	0	0	39
MOUNTAIN												
Montana	36	23	12	0	0	0	0	0	0	0	0	0
Idaho	2	10	3	0	0	0	0	0	0	0	0	0
Wyoming	6	28	24	0	0	0	0	0	0	0	[4] 0	0
Colorado	96	35	35	0	0	1	0	3	0	0	0	0
New Mexico	9	8	18	0	1	11	24	0	0	0	0	0
Arizona	10	15	13	0	0	0	27	1	0	0	0	0
Utah [2]	31	21	25	0	0	0	0	1	0	0	1	0
Nevada	0	0	-------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	51	17	19	0	0	0	0	0	0	0	0	0
Oregon	42	8	8	0	0	0	0	0	0	0	0	0
California	122	170	175	0	2	1	0	6	0	0	0	0
Total	2,634	2,942	2,942	1	46	435	213	15	0	4	49	150
38 weeks	145,326	136,936	139,425	48	1,582	12,414	3,037	540	19	410	651	[illegible]
38 weeks, 1942	-------	-------	-------	63	824	9,354	5,272	420	35	427	709	2,511

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Maine, 1; Massachusetts, 11; Connecticut, 1; New York, 1; Michigan, 6; Iowa, 1; New Mexico, 1; California, 1.
[4] Exclusive of delayed reports (included only in cumulative totals) of 6 cases in Wyoming.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 11, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	2	1	1	3	2	0	0	3
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	4	1	8	8	16	0	0	24
Fall River	1	0	------	0	0	1	0	2	1	0	0	0
Springfield	0	0	------	0	1	1	1	0	3	0	0	2
Worcester	0	0	------	0	0	0	4	0	7	0	0	3
Rhode Island:												
Providence	0	0	------	0	8	0	1	5	0	0	1	37
Connecticut:												
Bridgeport	0	0	1	1	0	1	1	2	0	0	0	0
Hartford	0	0	1	0	0	1	0	1	0	0	0	5
New Haven	0	0	------	0	0	0	0	10	8	0	0	8
MIDDLE ATLANTIC												
New York:												
Buffalo	3	0	------	0	1	1	2	5	3	0	0	4
New York	6	2	------	0	35	14	41	36	16	0	1	84
Rochester	0	0	------	0	0	1	6	2	4	0	1	7
Syracuse	0	0	------	0	0	0	2	0	1	0	0	17
New Jersey:												
Camden	1	0	1	1	1	0	1	0	1	0	0	0
Newark	0	0	------	0	5	2	0	0	1	0	0	36
Trenton	0	0	------	0	0	0	0	0	1	0	0	1
Pennsylvania:												
Philadelphia	1	0	------	0	2	5	13	2	9	0	2	43
Pittsburgh	1	0	------	0	6	2	8	0	9	0	1	13
Reading	0	0	------	0	0	0	0	0	0	0	0	3
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0	------	1	0	1	1	1	9	0	0	9
Cleveland	0	0	1	0	1	1	6	2	13	0	0	36
Columbus	0	0	------	0	0	0	2	0	2	0	0	7
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	0	0	0	0
Indianapolis	0	0	------	0	0	0	6	0	2	0	0	11
South Bend	0	0	------	0	4	0	0	0	3	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	1	0	1	1	5	3	8	124	16	0	0	74
Springfield	0	1	------	0	0	0	0	0	1	0	0	9
Michigan:												
Detroit	2	0	------	1	2	2	10	2	11	0	3	27
Flint	0	0	------	0	0	0	0	4	0	0	0	10
Grand Rapids	0	0	------	0	2	0	0	2	1	0	0	10
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	0	0	0	0
Milwaukee	0	0	------	0	2	0	0	8	14	0	0	54
Racine	0	0	------	0	1	0	0	0	0	0	0	11
Superior	0	0	------	0	17	0	0	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	0	0	1	1	2	0	0	14
Minneapolis	1	0	------	0	2	1	1	6	7	0	0	2
St. Paul	0	0	------	0	1	0	1	3	4	0	0	18
Missouri:												
Kansas City	1	0	------	0	0	0	9	5	1	0	0	1
St. Louis	1	0	------	9	1	4	6	2	1	0	2	11

City reports for week ended Sept. 11, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	0	0	------	0	0	0	3	16	6	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	0	1	0	0	0	0
Wichita	0	0	------	0	0	0	2	2	1	0	0	1
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	3	0	1	1	0	0	0	1
Maryland:												
Baltimore	1	0	------	0	1	0	3	0	4	0	0	56
Cumberland	0	0	------	0	0	0	0	0	1	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	1	1	4	2	1	2	1	0	1	9
Virginia:												
Lynchburg	1	0	------	0	6	0	0	0	0	0	0	11
Richmond	0	0	------	0	0	0	0	0	1	0	2	5
Roanoke	2	0	------	0	0	0	0	0	0	0	2	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	2	0	0	1
Wheeling	0	0	------	0	0	1	1	0	0	0	0	5
North Carolina:												
Winston-Salem	0	0	------	0	0	0	1	0	1	0	0	0
South Carolina:												
Charleston	0	0	------	0	1	0	0	0	0	0	0	0
Georgia:												
Atlanta	0	0	7	0	0	0	2	0	6	0	0	0
Brunswick	0	0	------	0	0	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	2	0	1	0	0	0
Florida:												
Tampa	1	0	------	0	0	0	2	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	0	0	6	0	0	0	1	1
Nashville	1	0	------	1	0	1	3	0	0	0	1	2
Alabama:												
Birmingham	0	0	------	0	0	1	0	0	1	0	0	0
Mobile	0	0	------	0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	1	0	------	0	0	1	5	0	0	0	0	0
Louisiana:												
New Orleans	0	0	5	0	1	2	6	3	0	0	6	1
Shreveport	0	0	------	0	0	0	0	0	0	0	0	0
Texas:												
Dallas	1	0	------	0	0	0	3	1	1	0	0	0
Galveston	1	0	------	0	0	0	1	2	0	0	0	0
Houston	0	0	------	0	3	0	7	9	2	0	0	0
San Antonio	0	0	1	0	0	0	3	0	0	0	0	0
MOUNTAIN												
Montana:												
Billings	1	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	4	0	0	0	0	0	0	3
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	1
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	1	6
Colorado:												
Denver	10	0	------	0	0	1	3	2	2	0	0	25
Pueblo	1	0	------	0	1	0	0	6	1	0	0	9
Utah:												
Salt Lake City	0	0	------	0	1	0	0	9	1	0	0	12

City reports for week ended Sept. 11, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	------	0	4	0	1	6	4	0	0	10
Spokane	0	0	------	0	2	0	0	1	1	0	0	3
Tacoma	0	0	------	0	0	0	1	0	1	0	0	4
California:												
Los Angeles	1	0	2	2	7	2	1	22	4	0	0	9
Sacramento	0	0	------	0	0	0	2	3	0	0	0	0
San Francisco	0	0	------	0	2	1	7	3	5	0	1	8
Total	43	3	21	9	143	55	209	325	212	0	26	762
Corresponding week, 1942	46	3	40	11	89	15	183	63	233	0	33	1,019
Average, 1938-42	58	------	39	[1] 8	[2] 135	------	[1] 215	------	235	1	51	1,149

Dysentery, amebic.—Cases: Boston, 1; New York, 4; St. Louis, 1; Baltimore, 1; San Francisco, 1.

Dysentery, bacillary.—Cases: New Haven, 5; Buffalo, 5; New York, 2; Springfield, Ill., 1; Detroit, 7; St. Louis, 2; Baltimore, 2; Richmond, 1; Charleston, S. C., 18; Los Angeles, 1.

Dysentery, unspecified.—Cases: Baltimore, 9; Richmond, 6; San Antonio, 1.

Rocky Mountain spotted fever.—Case: Lynchburg, 1.

Typhus fever.—Cases: Charleston, S. C., 2; Atlanta, 3; Savannah, 6; Tampa, 3; Memphis, 1; Nashville, 3; Birmingham, 1; New Orleans, 5; Dallas, 3; Houston, 1.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,581,800)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	2.5	0.0	5.0	2.5	37.3	14.9	39.8	77.0	79.5	0.0	2.5	204
Middle Atlantic	5.4	0.9	0.4	0.4	22.3	11.1	32.6	20.1	20.1	0.0	2.2	93
East North Central	2.9	0.6	1.2	1.8	19.9	4.1	19.9	83.5	42.6	0.0	1.8	145
West North Central	6.1	0.0	0.0	0.0	8.1	10.1	46.7	73.1	44.6	0.0	4.1	95
South Atlantic	8.7	0.0	13.9	1.7	26.0	5.2	22.6	5.2	29.5	0.0	8.7	153
East South Central	5.9	0.0	0.0	5.9	0.0	11.9	59.4	0.0	5.9	0.0	11.9	18
West South Central	8.8	0.0	17.6	0.0	11.7	8.8	73.8	44.0	8.8	0.0	17.6	3
Mountain	96.5	0.0	0.0	0.0	48.2	8.0	24.1	136.7	32.2	0.0	8.0	402
Pacific	1.7	0.0	3.5	3.5	26.2	5.2	21.0	61.2	26.2	0.0	1.7	59
Total	6.5	0.5	3.2	1.4	21.6	8.3	31.5	49.0	32.0	0.0	3.9	115

PLAGUE INFECTION IN CALIFORNIA AND MONTANA

Plague infection has been reported proved in pools of fleas and ticks from ground squirrels (*C. beecheyi*, with two exceptions) and prairie dogs collected in California and Montana, as follows:

CALIFORNIA

Kern County.—July 15, in a pool of 136 fleas from 6 ground squirrels taken on a ranch 7 miles northwest of Tehachapi; June 28, 2 specimens, pooled, consisting of 77 fleas from 10 ground squirrels, and 17 fleas from 2 ground squirrels, taken from two ranches approximately 3 miles northwest of Tehachapi.

Kings County.—July 25, 200 fleas from 10 ground squirrels taken 6 miles east and 4 miles south of Hanford.

Mono County.—July 14, 108 fleas from 18 ground squirrels, *C. beldingi*, taken 1 mile east of June Lake.

Monterey County.—Specimens collected on the dates given were taken in an area 10 to 13 miles south and 12 to 20 miles east of Monterey, as follows: July 1, 200 fleas from 35 ground squirrels and 175 fleas from 35 ground squirrels; July 9, 175 fleas from 33 ground squirrels; July 13, 2 lots, proved separately, each of 135 fleas from 16 ground squirrels; July 14, 140 fleas from 33 ground squirrels; July 19, 12 ticks from 33 ground squirrels, and 7 ticks from 12 ground squirrels; July 20, 160 fleas from 14 ground squirrels; July 22, 200 fleas from 19 ground squirrels, and 27 ticks from 19 ground squirrels; July 31, 200 fleas from 19 ground squirrels.

Nevada County.—July 5, 200 fleas from 18 ground squirrels.

Siskiyou County.—July 13, 201 fleas from 14 ground squirrels, *C. douglasii*, taken on a ranch 5 miles south and 3 miles east of Etna.

MONTANA

Custer County.—September 3, 296 fleas from 28 prairie dogs, *C. ludovicianus*, taken on a ranch 20 miles southeast of Miles City on U. S. Highway No. 212; September 4, 100 fleas from 30 prairie dogs, same species, taken from a ranch 27 miles southeast of Miles City.

TERRITORIES AND POSSESSIONS

Puerto Rico

Influenza.—Cases of influenza have been reported in Puerto Rico, as follows: Week ended July 16, 1943, 83; week ended July 23, 975; week ended August 6, 2,141. No report has been received from Puerto Rico for the week ended July 30.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 28, 1943.—During the week ended August 28, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		15		5	34	2	4	21	15	96
Diphtheria		9	2	19	3	5		1	2	41
Dysentery (bacillary)				6						6
German measles		1		1	6		1	2	4	15
Influenza			10		16				3	29
Measles		2		32	51	18	10	40	37	190
Meningitis, meningococcus					2		1		2	5
Mumps		13		2	49	12	3	18	18	115
Poliomyelitis			3	14	2	2		1		22
Scarlet fever	1	2	4	30	32	14	15	20	14	132
Tuberculosis (all forms)		8	3	184	27	18		10	11	261
Typhoid and paratyphoid fever			1	13	2					16
Undulant fever				3					1	4
Whooping cough		6		110	118	19	19	51	31	354

CUBA

Provinces—Notifiable diseases—4 weeks ended August 14, 1943.—During the 4 weeks ended August 14, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	3		4	4		18	29
Diphtheria	1	46	3			1	51
Leprosy				1		1	2
Malaria	24	16	16	41	19	225	341
Measles		6	4	1		1	12
Poliomyelitis				2			2
Scarlet fever		1					1
Tuberculosis	17	32	17	42	65	49	222
Typhoid fever	15	75	17	191	24	64	386
Whooping cough	4			1			5

[1] Includes the city of Habana.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

China.—A report dated August 26, 1943, states that cholera has appeared in epidemic form in Kweilin Province, where the number of deaths is increasing daily. From July 21 to August 5 there were 394 cases with 78 deaths reported with a mortality rate of 19.8 percent. It is said that the majority of the cases are among the poorer classes where the death rate is well over 50 percent. The epidemic has spread to Hengyang in southern Hunan Province and to many larger cities in Kwangsi Province.

Plague

Morocco (French).—For the month of July 1943, 7 cases of plague were reported in French Morocco.

Senegal.—Plague has been reported in Senegal and Dakar District as follows: For the period July 11–31, 1943, 10 cases were reported in Senegal and 1 case in Dakar District. For the period August 1–10, 1943, 1 case with 1 death was reported in Thies District, Senegal.

Smallpox

Guinea (French).—For the period August 1–10, 1943, 42 cases of smallpox with 9 deaths were reported in French Guinea.

Indochina.—For the period August 1–10, 1943, 39 cases of smallpox were reported in Indochina.

Iran.—For the period May 1 to June 11, 1943, 83 cases of smallpox were reported in Iran.

Sudan (French).—For the period July 11–31, 1943, 563 cases of smallpox were reported in French Sudan.

Turkey.—For the month of July 1943, 738 cases of smallpox (35 cases in Istanbul) were reported in Turkey.

Typhus Fever

Bulgaria.—For the period July 15 to August 18, 1943, 61 cases of typhus fever were reported in Bulgaria.

Ecuador.—For the period August 1–15, 1943, 9 cases of typhus fever with 3 deaths were reported in Ecuador.

Hungary.—For the 2 weeks ended September 4, 1943, 11 cases of typhus fever were reported in Hungary.

Iran.—For the period May 1 to June 11, 1943, 4,425 cases of typhus fever were reported in Iran, including 1,733 cases in Tehran.

Morocco (*French*).—For the month of July 1943, 497 cases of typhus fever were reported in French Morocco.

Rumania.—For the period August 24 to September 7, 1943, 71 cases of typhus fever were reported in Rumania.

Slovakia.—For the week ended August 28, 1943, 6 cases of typhus fever were reported in Slovakia.

Turkey.—For the month of July 1943, 339 cases of typhus fever (130 in Istanbul) were reported in Turkey.

COURT DECISION ON PUBLIC HEALTH

Piggery—held nuisance—operation enjoined.—(Michigan Supreme Court; *Mitchell et al.* v. *Hines et al.*, 9 N.W.2d 547; decided May 18, 1943.) Because of offensive odors from a piggery an action was brought to enjoin the defendants from operating the same. The plaintiffs were owners of residential properties located in the general vicinity of the farm on which the piggery was located. It was shown that since 1935 garbage collected from nearby cities was fed to the pigs, the number of which ranged from about 200 in 1935 to about 400 in 1940–41. The practice was to feed the garbage to the pigs in an open field and later to plow under the unconsumed portion. From an adverse decree in the trial court the defendants appealed to the Supreme Court of Michigan.

The latter court said that the case was not one where newcomers had moved into an unpleasant neighborhood and sought to change such neighborhood. Rather it was one where the piggery was conducted unobjectionably on a small scale for some years and then offensive odors were created through either the increased size of the piggery or the condition of the fields because of the continued dumping of garbage thereon, or both. The court was of the view that there was a nuisance justifying the issuance of an injunction. It was pointed out that, although a court of equity "is reluctant to bar the operation of a lawful business and will not do so if a remedy may be applied to the nuisance incidental thereto," tests did not show any satisfactory means of carrying on a large-scale garbage-feeding piggery. "No method of feeding garbage to pigs on a commercial scale, as is here the case, in a manner that will not constitute a nuisance has been disclosed by the proof."

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 **OCTOBER 8, 1943** NUMBER 41

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Public Health Reports

Vol. 58 • OCTOBER 8, 1943 • *No. 41*

A STUDY OF AN OUTBREAK OF FOOD POISONING IN A HOSPITAL IN GALVESTON, TEXAS

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An outbreak of food poisoning occurred in a general hospital in Galveston, Texas, on July 6, 1943. The hospital, used to a large extent for training medical and nursing students, was established over 50 years ago, and while the facilities for medical care have been increased markedly from time to time, those for cooking and storage of foods for patients and personnel have been increased but little.

At the time of the outbreak, the afternoon and evening of July 6, the patients in the institution numbered 390 and the personnel 610 (320 white and 290 colored). There appears to have been at least 85 cases of gastro-intestinal irritation among the patients and 250 cases among the personnel.

Study of the outbreak was begun on July 7.

SCOPE OF STUDY

The study comprised:

(1) Obtainment of clinical histories of a number of the cases.

(2) Collection of data regarding the distribution of cases among patients by wards and among personnel by race.

(3) Determination of the kinds of foods and beverages consumed by the patients and the personnel—both the affected and the unaffected—in the period of causation of the outbreak.

(4) Surveys of conditions under which the foods and beverages were prepared, stored, and served to the patients and the personnel during the several days before the beginning of the outbreak.

(5) Submission of samples of foods and beverages regarded as possibly implicated to the laboratories of the Department of Bacteriology, the Department of Pathology, and the Department of Preventive Medicine for bacteriological examination.

Especial attention was given to factors which might have operated in contamination of the foods by human hands, by flies, roaches, mice, and other vermin, and to temperature and moisture maintained in the refrigerators in which the foods were stored.

Questionnaires were used to obtain clinical and epidemiological histories of the personnel. The form was as follows:

JULY 9, 1943.

Name .... Race W( ) C( )
Position ....

Have you had an attack of diarrhea and/or vomiting since noon of Tuesday, July 6? Yes ( ) No ( ).
If so, at what hour on what day did it begin? ....

At the midday meal on Tuesday, July 6, of which of the following articles of food did you partake:

	Yes	No
Chicken salad	------	------
String beans	------	------
Escalloped potatoes	------	------
Ice cream	------	------
Bread	------	------
Milk	------	------

From the total personnel of 610, questionnaires which had been satisfactorily filled out were obtained from 272 (183 white and 89 colored).

CLINICAL CHARACTER OF CASES

In general, the clinical manifestations of the cases were very similar. The predominating symptoms were nausea, vomiting, abdominal cramps, and purging, but no fever. The duration of the attacks ranged from 2 to 72 hours, but in most cases it was from 4 to 12 hours. Blood was not apparent in either vomitus or stools. The stools usually were liquid and copious and averaged 5 to 10 in number during the attack. The attacks were distressing and in varying degrees exhausting, but none were reported gravely serious.

PERIOD OF OUTBREAK

The earliest cases had onsets between 2 and 3 p. m. on July 6, and the latest from 36 to 48 hours thereafter. Over 80 percent of the cases had onsets between 2 and 8 p. m., July 6.

DISTRIBUTION OF OUTBREAK

The outbreak was confined to patients and personnel who had their meals prepared in and distributed from one common kitchen. Many scores of persons taking their meals outside the hospital, but who before, during, and after the outbreak were in close and frequent

contact with those affected, remained entirely exempt. The rate of recorded incidence, which averaged 21.8 percent among the whole body of patients, was far from uniform among patients in the different wards; but there were cases among patients in every building, on every floor, and in every section for patients in the hospital. The rate of reported incidence in wards here and there was low, and in others similarly separated it was high. In five wards, including two for young children, with the number of patients in wards ranging from 7 to 19 and aggregating 64, only 2 cases were recorded. In six other wards in the same buildings or sections as the low-rate wards, with the number of patients to wards ranging from 9 to 21 and aggregating 92, there were 45 recorded cases. Most of the difference may have been due to varying degrees of completeness of reporting and to difference in food and other habits among the patients. Some of it may have been due to mere chance, as is to be expected in outbreaks among a large number of persons separated by place of domicile into various small groups.

From the returns on the questionnaires used in canvassing the personnel and from other evidence, it appears that the rate of incidence was in general considerably higher among personnel than among patients. According to these returns, the incidence rate was over 50 percent among the white and over 75 percent among the colored personnel. It is probable that those who were attacked showed more interest in filling out and returning the questionnaires than those who were not attacked. Furthermore, some of the difference in rates may have been due to difference in food or other habits or in susceptibility to the disease.

POSSIBLE FACTORS OF CAUSATION

The explosive character, the clinical manifestations, and the distribution of the cases taken together suggested strongly at the outset of the study that the outbreak was caused by food poisoning.

The distribution of the outbreak and the methods of serving drinking water to the different groups affected eliminated water as a factor. The water used for drinking and other purposes was all from the Galveston city public supply.

The distribution of the outbreak and the ways in which ice was served among patients and personnel and was used for cooling drinking water in the hospital cafeterias eliminated ice in drinking water or in any other beverage as a factor. The ice came from a widely marketed supply in Galveston.

The explosiveness and the distribution of the outbreak precluded contagion or personal contact between cases as a factor.

Thus, it quickly became apparent that food must have been the medium of conveyance of the causative agent.

The next step was to determine in what meal or meals the causative agent was spread. Due to temporary absence from the hospital, night duty, or some other reason, a considerable number of the personnel, including 23 among the white personnel who returned the questionnaires, did not partake of the noonday dinner served in the hospital on July 6 but had eaten several meals at the hospital immediately preceding that dinner. None of these persons was attacked. Not a case was reported or found in any person who did not partake of the dinner served in the hospital on July 6. Thus, that dinner was definitely implicated and all preceding meals served in the hospital were definitely eliminated.

The menu of the dinner of July 6 for patients and personnel on regular diet consisted of chicken salad, boiled string beans, escalloped potatoes, strawberry ice cream, bread, and milk. Those on regular diet included a large majority of the patients and all or nearly all of the personnel.

The milk was obtained from a widely marketed pasteurized supply in Galveston and was delivered in well-capped bottles (half pints and quarts) to the hospital.

The ice cream was obtained from a widely marketed pasteurized supply in Galveston and was delivered in individual service paper wrappers to the hospital.

No outbreak of gastro-intestinal irritation coincident with that in the hospital was reported in the city of Galveston.

The escalloped potatoes and the string beans were freshly cooked and were served while still hot.

The chicken salad had the following interesting and somewhat complex history of origin, preparation, and distribution:

The chickens, small 2-year-old hens, were purchased from a chicken grower in a village within a few miles of the hospital. They were killed and picked, and delivered to the hospital on the evening of July 1. Upon delivery, they were piled into a refrigerator as they were with heads and feet on and undrained. On the morning of July 2, they were packed in ice, each layer of hens between two layers of ice, and restored in the refrigerator. On the morning of July 3, the hens were taken out of the refrigerator, and after being drawn and washed and heads and feet removed were returned to the refrigerator. On the afternoon of July 3, one-half of the batch of hens were roasted, and after cooling for an hour or two at kitchen temperature (which was probably over 95° F.) were put in the refrigerator. On the morning of July 4, the roasted chickens were carved, heated up in gravy, and while still warm distributed to the wards and cafeterias. No gastro-intestinal irritation or other ill consequence was noted to have resulted from the consumption of the dinner served on July 4.

The other half of the batch of hens were cooked in large pots on the afternoon of July 5. The cooking consisted of thorough boiling in salted water for 2 to 3 hours, thereby making the meat tender and readily removable from the bones. The boiled hens while still hot were piled up in the refrigerator. Such a mass of hot meat must have caused some rise in the temperature of the refrigerator and the deeper or central parts of the mass of meat must have remained warm for some hours—probably 12 hours or more—after the meat was put in the refrigerator. The air temperature in this refrigerator, under usual conditions of operation, ranges from 42° F. to 55° F. with a relative humidity averaging 85 percent. However, the temperature and humidity of the kitchen air were found so high that the frequent entrance of this air into the refrigerator results in a large precipitation of moisture on the cooling coils, floor, walls, and exposed surfaces of cooled foods in the refrigerator.

Beginning about 6:30 a. m. on July 6, the boiled hens were removed from the refrigerator into the kitchen where the meat was stripped from the bones, mixed with hard boiled eggs and celery (from Galveston market), and the mixture was run through a chopper and grinder. A mayonnaise dressing consisting of oil, whole raw eggs, vinegar, salt, and paprika beaten together in a large electric mixer was then worked thoroughly by hand into the chicken mixture. All of the mayonnaise so used was said to have been freshly made that morning. The dressing was added and mixed into the chicken in two large trays. The preparation of each tray load in the kitchen took 2 or 3 hours. The first tray of salad was put into the refrigerator while the second tray was being completed. The second tray load was distributed immediately upon completion without being put into the refrigerator. The ventilation of the kitchen is inadequate and its air temperature in periods of cooking is at this time of year uncomfortably high. The first tray load of salad went to the "help" cafeteria where part of it was served to about 250 persons, mostly colored, who eat there. The remainder of that tray load was distributed to the wards where it was taken in a number of carts, one to each ward, and from the carts it was placed on individual plates or trays for service to the patients. The second tray load went to the cafeteria for white personnel and was there served on individual plates, cafeteria style. What was left over in the personnel cafeteria was sent to the "help" cafeteria.

Among the personnel, everyone who was attacked in the outbreak gave a history of having eaten some of the chicken salad; no one who had not eaten the salad became ill.

Of the white personnel eating dinner in the personnel cafeteria on July 6, 160 returned questionnaires giving detailed data. Of these 160, the returns indicate that 97 were attacked and 63 were not

attacked. The following table indicates the percentages of the attacked and the unattacked who ate the different foods served in the dinner:

Foods served:	Percentage of personnel eating different foods	
	Attacked	Not attacked
Chicken salad	100.0	84.1
String beans	72.2	71.3
Escalloped potatoes	75.2	76.2
Ice cream	94.8	95.2
Bread	75.2	76.2
Milk	86.5	81.2

Among the colored personnel returning the questionnaires with sufficient data for tabulation purposes, 74 were attacked and 15 were not attacked. Of the attacked everyone gave a history of having eaten the chicken salad. Of the 15 not attacked 5 gave a history of not having eaten the salad.

Among the patients who were attacked all except two—and these had somewhat atypical cases—were among those who ate chicken salad. One of the exceptional cases was in a Negro woman with diabetes. She was one of nine patients who had sliced chicken instead of chicken salad for dinner on July 6. She did not have ice cream. She had abdominal cramps beginning about 5 hours after dinner and, although she ate a hearty supper a half hour later, she had no nausea nor vomiting. Her attack of diarrhea was comparatively mild and of short duration. The other case was in an elderly white woman who had had a hysterectomy performed 7 days before. She had some abdominal pain, perhaps somewhat more than she had been having since her surgical operation, and a comparatively mild attack of diarrhea beginning about 7 hours after she ate dinner on July 6. Her dinner at that time consisted of chicken soup and ice cream. She was one of 33 patients who had chicken soup but no chicken salad nor sliced chicken at dinner that day and she was the only one in that group who within the next few days had any unusual gastric or intestinal disturbance. It is quite possible that both of these cases were entirely coincidental to and were not connected with the outbreak. The sliced chicken and the chicken used in the soup were obtained from five of the hens which were cooked in a separate pot in a side room from the main kitchen where those for the salad were cooked. These five hens, however, after being cooked, were stored for 12 to 24 hours in the same refrigerator immediately alongside those cooked for use in the salad.

The epidemiological evidence alone definitely established (*a*) the noonday dinner as the meal in which the causative agent of the outbreak was distributed and (*b*) the chicken salad as the sole or almost sole medium of conveyance. The short interval between the eating

of this meal and the beginning of the outbreak was evidence that the outbreak was caused by a preformed toxin instead of bacterial infection such as occurs in outbreaks due to Salmonella organisms.[1] The interval, however, was too long to arouse suspicion of mineral poisoning attended with symptoms of those manifested in the outbreak. Both the epidemiology and the symptomatology eliminated edible poisonous plants and shellfish as the source of the causative agent. Thus all of the epidemiological and clinical evidence pointed convincingly to an enterotoxin such as that produced by *Staphylococcus aureus* as the causative agent.

According to detailed data obtained from 97 of the attacked white personnel, the interval between the eating of the implicated meal and the onset of symptoms was as follows:

Hours:	*Number of cases*	Hours:	*Number of cases*
2–3	6	13–14	1
3–4	12	18–19	3
4–5	20	20–21	1
5–6	18	21–22	1
6–7	16	36–48	2
7–8	10	48–72	1
8–9	1		
9–10	4	Total	97
10–11	1		

How the chicken became contaminated was the next question to be answered. It may have been by human hands, by flies, roaches, mice, or other vermin, or through the air—the greatest probability being human hands.

The care and cleanliness of the hands and clothing of most of the food handlers in the kitchen were far from scrupulous. The sanitary and hygienic conditions in the kitchen and refrigerators and in the immediate outside vicinity were not altogether satisfactory. Flies were numerous in the kitchen and from time to time some invaded the refrigerators. Due to shortage of receptacles some of the garbage, broken dishes, and other refuse were piled up on the floor of a small room separated from the kitchen only by a door which was frequently opened. For final disposal most of the garbage was hauled away by a private contractor but some of it, along with tin cans and other refuse, was dumped in a heap on the surface of the ground in an area with standing water less than 200 feet back of the kitchen. Flies were breeding abundantly in this refuse dump and the dump almost certainly was visited frequently by various insects besides flies and by mice, rats, and other vermin.

[1] G. M. Dack: Food Poisoning. The University of Chicago Press, Chicago, 1943. Pp. 71 to 75 and 100 to 105.

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The chief cook and his two women assistants were the main handlers of the chicken which went into the salad. They handled the boiled chickens after the cooking on July 5. They stripped the meat from the bones and by hand mixed and thoroughly worked the mayonnaise dressing into the ground chicken on the morning of July 6. Staphylococci of the food poisoning variety would not withstand the heating which must have occurred in the course of the 2 or 3 hours of boiling on July 5. Therefore the contamination of the chicken must have taken place after the chicken was cooked on July 5. Multiplication of and enterotoxin production by such organisms in such a medium could have gone on rapidly and abundantly for hours in the deeper parts of the mass of hot to warm meat after it was placed in the refrigerator on July 5 and during the processing of the meat into salad on July 6. The chief cook was a possible source of the infection which was introduced into the chicken. He had had an attack of diarrhea which began June 30 and continued through July 3. He had remained home during his illness and had returned to duty in the hospital kitchen in the early morning of July 4. He did most of the carving of the roasted chicken which was served at dinner on July 4. He may or may not have contaminated the chicken served that day. No trouble would have resulted if he had done so because the roasted chicken, immediately after being carved, was put into pans of gravy, heated, and served hot or warm immediately afterwards. Therefore there was not time for any considerable multiplication of organisms such as enterotoxin producing staphylococci to take place in the chicken between carving and serving. It is evident that this food handler cannot be definitely eliminated as a possible source of the contamination of the chicken handled by him on July 5 and 6.

The service demand upon the hospital kitchen is exceedingly heavy. In this one kitchen about 3,000 meals a day are prepared. The space is inadequate, much of the equipment is outworn, and the personnel problem due to turn-over and at times shortage of force is serious.

LABORATORY FINDINGS

The findings in three separate laboratories of the University of Texas Medical Branch from the bacteriological examination of samples of the different articles of food served in the implicated meal were entirely consistent. They included: (1) Presence of *Staphylococcus aureus*, appearing from the study so far made to be of the enterotoxin producing type,[2] in predominant number and of the colon bacillus (*Escherichia coli*) in large number in the chicken salad; (2) absence of Salmonella organisms from the chicken salad;

[2] Coagulase positive. It liquefies gelatin when tested with the technique of R. V. Stone (Proc. Soc. Exper. Biol. and Med., 33:185-87, 1935).

and (3) absence of the staphylococci and also of Salmonella organisms and colon bacilli (*Escherichia coli*) from the milk, ice cream, potatoes, and beans, and from salad dressings made similarly to the dressing which had been used in the chicken salad.

A specimen of feces obtained from the chief cook in the hospital kitchen 4 days after the development of the outbreak on July 6, and specimens of feces obtained on July 7 from two patients who still had some diarrhea remaining at the time, were examined in the laboratory of the Department of Bacteriology and found negative for *Staphylococcus aureus* and Salmonella.

A highly significant finding in each of the three laboratories was the presence in the specimens of the chicken salad of *Staphylococcus aureus* in large numbers and the absence of other kinds of organisms found in food poisoning. This finding is in entire accord with the epidemiological evidence.

Of especial significance was the finding of *Staphylococcus aureus* in large numbers in the specimen of chicken bones sent to one of the laboratories. These bones had been stripped of chicken which went into the salad. Immediately after the meat had been stripped from them, the bones had been removed from the kitchen and stored in the refrigerator. The abundance of the staphylococci in the bones definitely implicates the chicken and eliminates the mayonnaise dressing, the celery, the eggs, and all of the other ingredients of the chicken salad except the meat as the medium of conveyance of the causative agent of the outbreak.

The negative results of the bacteriological examinations of foods other than the chicken salad served in the dinner of July 6 are in accord with the epidemiological evidence.

The negative result of the bacteriological examination of the specimen of feces which was obtained from the chief cook on July 10 is of no epidemiological significance because his intestinal tract may have become free from the implicated staphylococcus in the interval between July 6 and July 10.

The negative results of the bacteriological examination of the specimens of feces obtained from two of the patients during their attacks of diarrhea suggest to a slight degree at least that persons ingesting the living staphylococci along with their preformed enterotoxin in sufficient quantity to cause purging harbor the living organisms in their gastro-intestinal tracts for only a short time. This is fortunate, if true.

The finding of numerous colon bacilli (*Escherichia coli*) in each of the samples of chicken salad examined indicates fecal contamination. Either the contamination was heavy or a multiplication of the organisms occurred after the contamination. The contaminating

matter carrying the *B. coli* may have carried at the same time or times the staphylococci involved in the outbreak.

SUMMARY

In an outbreak of food poisoning in a large general hospital with 390 patients and 610 personnel having meals regularly in the hospital about 22 percent of the patients and over 50 percent of the personnel were attacked.

The clinical manifestations of the cases in general were very similar, with nausea, vomiting, abdominal cramps, and purging predominant.

The outbreak was widely distributed among the patients and personnel but was confined to those who ate chicken prepared in one common kitchen and served on July 6, 1943, in the noonday meal.

The hygienic and sanitary conditions under which the foods in the implicated meal were prepared, stored, and distributed were found to be largely unsatisfactory.

The epidemiological evidence obtained during the study made of the outbreak was conclusive and was supported altogether by the findings from bacteriological examinations in three separate laboratories of samples of the different foods served in the implicated dinner.

CONCLUSIONS

The medium of conveyance of the agent causing the outbreak was chicken served at the noon dinner on July 6, 1943.

Chicken salad was the sole, or certainly the almost sole, medium of conveyance.

The causative agent was a bacterial toxin produced by *Staphylococcus aureus* of the specifically enterotoxin forming type.

The introduction of *Staphylococcus aureus* on or into the chicken may have been by human hands, dropping perspiration, floating droplets from the nose or throat of some one or more of the food handlers in the kitchen, by flies, roaches, mice, or other vermin, or through air currents. Most probably it was introduced by human hands.

The chicken became contaminated with the staphylococci during the process of handling and exposure of the meat in the kitchen or during storage in the refrigerator subsequent to cooking on July 5. The much greater probability is that contamination occurred during handling in the kitchen.

There was a tremendous multiplication of the infecting organisms in the meat during storage in the refrigerator from the afternoon of July 5 to the morning of July 6 and during the several hours that the meat was being made up into salad in the high temperature of the kitchen on the morning of July 6.

The laboratory finding of the staphylococci in the bones from which the meat for the salad was removed eliminates the mayonnaise dressing, the eggs, and the celery used in the salad as being together or separately an important factor in the causation of the outbreak.

The temperature of the refrigerator room in which the large mass of hot chicken was placed for storage on July 5 is not, with the present inadequate equipment and the mode of operation of the refrigerator, maintained at a sufficiently low degree even under usual circumstances.

HARBORAGE OF *RATTUS RATTUS ALEXANDRINUS*[1]

By B. K. Milmore, *Passed Assistant Surgeon, United States Public Health Service*

It is frequently stated and generally believed that *Rattus rattus alexandrinus*, the common roof or gray rat, inhabits upper parts of buildings and rarely if ever burrows in the ground. *Rattus rattus rattus*, the black or ship rat, is probably only a color variant of *R. r. alexandrinus* (*1*) and specimens intergrade (*2*). There is no reason to believe that habits of black and gray rats differ materially. The burrowing habits of *Rattus norvegicus*, the common brown or sewer rat, are well known.

Lantz (*3*) reported as follows: "In buildings, the brown rat keeps mainly to the cellar and lower parts, where it commonly lives in burrows * * *. The roof rat and the black rat live in the walls or in the space between ceilings and roofs." In the 1927 edition of Preventive Medicine and Hygiene, Rosenau (*4*) reported that "the brown rat differs somewhat in habits from the black rat, especially in that it burrows, which protects it against its enemies and renders its suppression more difficult." An article in Public Health Reports in 1928 (*5*) stated: "The roof rat (*Rattus alexandrinus*) and the black or 'ship' rat (*Rattus rattus*) look for double walls and dusty attics wherein they find protection from their arch enemy, the more ferocious but less agile brown or 'sewer' rat." Creel and Akin (*6*) wrote: "The black rat ordinarily does not burrow, but lives in hollow walls, garrets, or loose material such as empty boxes, barrels, or any rubbish, and within buildings frequents the upper stories and roof, away from its enemy, the brown rat." This sentence is repeated verbatim by Holsendorf (*7*) and in slightly altered form by Dunham (*8*). According to Hinton (*9*), "*R. rattus* is essentially an arboreal or climbing animal, and it rarely burrows: hence, where infesting buildings or huts, it is found usually in the walls, ceilings, or roof, not in cellars or drains." Ehlers and Steel (*10*) said that black and roof rats "tend to nest in trees." The British Ministry of Agriculture and Fisheries (*11*) reported that the brown rat "is a better burrower than the black rat."

[1] From the States Relations Division.

The writer knows of only five published reports that definitely describe underground activity of the *R. rattus* group. Eskey (*12*) reported in 1932 that over a hundred *R. r. alexandrinus* and *R. r. rattus* had been caught in the sewers of Lima, Peru, although over 99 percent of rats caught in these sewers were *R. norvegicus*. In 1934 the same author in his discussion of plague in the Hawaiian Islands (*13*) reported as follows: "In central Maui, where there were no *R. norvegicus*, the *R. rattus* group were encountered in great numbers under buildings. In one instance over a hundred were dug out of manure boxes in a chicken house, while in another, three *R. alexandrinus* were excavated from underground burrows in the center of a chicken yard. The *R. rattus* group, both black and gray species, were so frequently encountered under floors of buildings in central Maui that it seemed they preferred such places for their nests." On the basis of Eskey's observations, Rosenau (*14*) reported in 1935 as follows: "*Rattus rattus rattus* and *alexandrinus* when present in conjunction with the more vicious and larger *Rattus norvegicus* usually nest in the upper parts of buildings but in localities where the larger species are few or absent they will be found in large numbers in nesting places under buildings and in burrows or the same harborage places generally preferred by *Rattus norvegicus*." In 1936 Dopmeyer (*15*) reported that on the Island of Maui "as many as 13 rats were found in one tunnel system, and all 3 species were found, the native *hawaiiensis* far outnumbering the other 2 species. In a few cases all 3 species were found in the same tunnel, but in these cases the rats may have sought temporary shelter after natural living conditions had been disturbed." Perolio (*16*) in 1943 reported that in Alabama black and gray rats usually nest in upper parts of buildings but that they have been trapped on lower floors and even underground, although this only occurs when Norway rats are few or absent in the locality.

In the course of endemic typhus control activities in southeastern States during recent years several instances of extensive burrowing by *R. r. alexandrinus* have been observed in basements and under floors that were close to the ground. One striking example was a grocery store in Woodruff, S. C., which was fumigated with hydrocyanic acid gas in March 1942 and again in September 1942. On both occasions only gray rats were recovered: 44 in March and 237 in September. At the latter fumigation 15 rats were found in a burrow alongside an old sewer pipe. This burrow passed under the foundation of the building 18 inches below the level of the ground under the building (36 inches below outside ground level). It provided easy passage for rats into and out of the building and was obviously an active thoroughfare. In this and other buildings in which gray rats were known to burrow, *R. norvegicus* was not found. *R. r. alexandrinus* and *R. norveg-*

icus often coinhabit buildings, but in such circumstances only the latter has been encountered in burrows.

Sometimes rodent infestation of a building or entire city block is limited to mice, gray rats, and black rats although adjacent buildings or blocks harbor also Norway rats. In Adel, Ga., extensive trapping in the business district for over a month in the summer of 1940 yielded only mice and gray rats in spite of the fact that neighboring communities harbored all three of the common types of rats. In Adel, *R. alexandrinus* also burrowed extensively under chicken coops and under floors.

CONCLUSION

Contrary to the general belief that *R. r. alexandrinus* inhabits only upper parts of buildings, the observations presented show that this species sometimes burrows in the ground and may be encountered under buildings and in basements and sewers. Most descriptions overemphasize the differences in harboring habits of the common species of rats.

REFERENCES

(*1*) Williams, C. L.: A rat and rat-flea survey of ships at the port of New York Pub. Health Rep., 44: 443–476 (Mar. 1, 1929). (Reprint No. 1267.)

(*2*) Anthony, H. E.: Field Book of North American Mammals. G. P. Putnam's Sons, New York, 1928.

(*3*) Lantz, D. E.: Natural history of the rat. *In* The Rat and Its Relation to the Public Health. Pub. Health Bull. No. 30. Government Printing Office, 1910.

(*4*) Rosenau, M. J.: Preventive Medicine and Hygiene. Fifth edition. D. Appleton and Co., New York, 1927.

(*5*) U. S. Public Health Service: The rat: a health menace that should be eradicated. Pub. Health Rep., 43: 2157–2159 (Aug. 17, 1928).

(*6*) Creel, R. H., and Akin, C. V.: The Rat. Arguments for its Elimination and Methods for its Destruction. Pub. Health Bull. No. 180. Government Printing Office, 1928.

(*7*) Holsendorf, B. E., and Clark, P. W.: The Rat and Ratproof Construction of Buildings. Supplement No. 131 to Public Health Reports. Government Printing Office, 1937.

(*8*) Dunham, G. C.: Military Preventive Medicine. Third edition. Military Service Publishing Co., Harrisburg, Pa., 1940.

(*9*) Hinton, M. A. C.: Rats and Mice as Enemies of Mankind. Third edition. Adlard and Son, Ltd., London, 1931.

(*10*) Ehlers, V. M., and Steel, E. W.: Municipal and Rural Sanitation. Second edition. McGraw-Hill Book Co., Inc., New York, 1937.

(*11*) Rats and How to Exterminate Them. Bulletin No. 30, Ministry of Agriculture and Fisheries, London, 1937.

(*12*) Eskey, C. R.: Epidemiological study of plague in Peru. Pub. Health Rep., 47: 2191–2207 (Nov. 18, 1932).

(*13*) Eskey, C. R.: Epidemiological Study of Plague in the Hawaiian Islands. Pub. Health Bull. No. 213. Government Printing Office, 1934.

(*14*) Rosenau, M. J.: Preventive Medicine and Hygiene. Sixth edition. D. Appleton-Century Co., Inc., New York, 1935.

(*15*) Dopmeyer, A. L.: Plague eradicative measures on the Island of Maui, Territory of Hawaii. Pub. Health Rep., 51: 1533–1556 (Nov. 6, 1936). (Reprint No. 1781.)

(*16*) Perolio, A. J.: Methods of Rodent Control and Rat-borne Diseases. Typhus Control Division, Alabama State Department of Public Health, Montgomery, Ala., 1943.

AMERICAN Q FEVER: THE OCCURRENCE OF *RICKETTSIA DIAPORICA* IN *AMBLYOMMA AMERICANUM* IN EASTERN TEXAS [1]

By R. R. PARKER, *Director, Rocky Mountain Laboratory*, and GLEN M. KOHLS, *Associate Entomologist, United States Public Health Service*

The presence of *Rickettsia diaporica*, the causative agent of American Q fever, was demonstrated in 1937 in 10 of 92 lots of nymphal and adult *Amblyomma americanum* collected during July and August in Liberty County, eastern Texas. These ticks were tested primarily for the possible presence of the rickettsia of Rocky Mountain spotted fever, a case of which had recently occurred in the general area where the collections were made. The results of the test with respect to this disease agent were not definite. The recovery of *R. diaporica* was entirely unexpected.

The collection, locality, and host date for the 10 lots positive for *R. diaporica* are given in the following table:

Number of ticks		Source of ticks		Date collected	Locality of collection (Texas)
Adults	Nymphs	Host	Ground or vegetation		
22		Goat		July 15	Plum grove.
4			+	July 16	Along east San Jacinto River.
	23	Goat		July 22	Plum grove.
27		Cow		July 23	Do.
19	10	Cow		Aug. 4	Do.
	9		+	Aug. 8	Cleveland.
	100		+	Aug. 9	Do.
	17		+	Aug. 13	Do.
	80		+	Aug. 14	Do.
5	32	Dogs		Aug. 14	Do.

Passage strains initiated from guinea pigs used to test the ticks of the positive lots were maintained through sufficient transfers to permit the identification of the rickettsia. The manifestations of disease were similar to those characteristic of the original strain recovered from *Dermacentor andersoni* in Montana. All animals were febrile. In those that died and in those sacrificed the spleen was enlarged up to six times the original size and was generally smooth. The inguinal nodes and often the mesenteric nodes were enlarged and sometimes slightly injected. Pneumonitis was present in some animals. Some of those that recovered were tested for immunity to American Q fever and were found immune. Some were tested for immunity to Rocky Mountain spotted fever and were found to be susceptible. Blood serum passed through Berkefeld filters was infectious. One strain was fatal to approximately 50 percent of the test animals.

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

No attempt was made to demonstrate rickettsiae in the animal tissues, but a strain established in eggs exhibited the characteristics of *R. diaporica*.

Acknowledgement is due to George W. Cox, State health officer of Texas, who kindly provided assistance for collecting ticks and also to T. MacGregor of the Texas State Board of Health Laboratory.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period January–June 1943

The following is a list of publications of the United States Public Health Service issued during the period January–June 1943.

The purpose of the publication of this list is to provide a complete and continuing record of Public Health Service publications for reference use by librarians, scientific workers, and others interested in particular fields of public health work, and not to offer the publications for indiscriminate free public distribution.

Those publications marked with an asterisk (*) may be obtained only by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices noted.

Periodicals

*Public Health Reports (weekly), January–June, vol. 58, Nos. 1 to 26, pages 1 to 1000. 5 cents a number.

*Venereal Disease Information (monthly), January–June, vol. 24, Nos. 1 to 6, pages 1 to 184. 5 cents a number.

*Journal of the National Cancer Institute (bimonthly), December–June, vol. 3, Nos. 3 to 5, pages 227 to 581. 40 cents a number.

Reprints From the Public Health Reports

2438. Coccidioidomycosis in wild rodents. A method of determining the extent of endemic areas. By C. W. Emmons. January 1, 1943. 5 pages.

2439. Distribution of health services in the structure of State government. Chapter VIII. Industrial health activities by State agencies. By Joseph W. Mountin and Evelyn Flook. January 8, 1943. 26 pages.

2440. Public Health Service Drinking Water Standards and manual of recommended water sanitation practice. Standards adopted by the Public Health Service September 25, 1942, for drinking and culinary water supplied by common carriers in interstate commerce. January 15, 1943. 43 pages.

2441. A nation-wide study of the bacterial etiology of the pneumonias. By A. S. Rumreich, H. J. Shaughnessy, J. V. Mulcahy, J. C. Willett, W. H. Kellogg, and Wm. C. Mitchell. January 22, 1943. 14 pages.

2442. Growth measurements of *Anopheles quadrimaculatus* larvae. By Frederick L. Knowles. January 22, 1943. 4 pages.

2443. Mouse protective values of antimeningococcus serum in comparison with precipitation in immune serum agar plates. By Margaret Pittman. January 22, 1943. 4 pages.

2444. Sanitation manual for land and air conveyances operating in interstate traffic. January 29, 1943. 34 pages.
2445. The identification and localization of lead in bone tissue. By Lawrence T. Fairhall. February 5, 1943. 8 pages; 2 plates.
2446. The microclimate of diurnal resting places of *Anopheles quadrimaculatus* Say in the vicinity of Reelfoot Lake. By Don E. Eyles and Lindsay K. Bishop. February 5, 1943. 14 pages.
2447. Rocky Mountain spotted fever: duration of potency of tick-tissue vaccine. By R. R. Parker and Edward A. Steinhaus. February 5, 1943. 2 pages.
2448. List of State and insular health officers (as of January 15, 1943). February 5, 1943. 3 pages.
2449. Distribution of health services in the structure of State government. Chapter IX. Central State services affecting all branches of public health work. By Joseph W. Mountin and Evelyn Flook. February 12, 1943. 30 pages.
2450. A self-help solution of State personnel problems. By Joseph W. Mountin. February 19, 1943. 8 pages.
2451. An outbreak of *Microsporon lanosum* infection from a kitten. By Isadore Botvinick, Samuel M. Peck, and Louis Schwartz. February 19, 1943. 3 pages.
2452. Report on market-milk supplies of Public Health Service milk ordinance communities, January 1, 1941 to December 31, 1942. February 19, 1943. 5 pages.
2453. A practical plan for the treatment of superficial fungus infections. By Samuel M. Peck and Louis Schwartz. February 26, 1943. 9 pages.
2454. Status of full-time local health organization at the end of the fiscal year 1941–1942. By F. W. Kratz. February 26, 1943. 7 pages. 5 cents.
*2455. Experimental Rocky Mountain spotted fever: results of treatment with certain drugs. By Edward A. Steinhaus and R. R. Parker. February 26, 1943. 2 pages.
2456. *Triatoma sanguisuga* (LeConte) and *Triatoma ambigua* Neiva as natural carriers of *Trypanosoma cruzi* in Texas. By Dorland J. Davis, Theodore McGregor, and Thelma deShazo. February 26, 1943. 2 pages.
2457. Coliform confirmation from raw and chlorinated waters with brilliant green bile lactose broth. By Elsie Wattie. March 5, 1943. 7 pages.
2458. Parental and familial factors in the acceptance of diphtheria and smallpox immunization. By Lester Breslow, Pearl R. Shalit, and Gaylord W. Anderson. March 5, 1943. 13 pages.
2459. Experiments in the cooking of garbage for the destruction of trichinae in pork scraps. By Willard H. Wright and John Bozicevich. March 5, 1943. 9 pages.
2460. Rickettsia-like organism from normal *Dermacentor andersoni* Stiles. By Edward A. Steinhaus. September 11, 1942. 3 pages.
2461. Rural sewage disposal. Recommendations of Joint Committee on Rural Sanitation. March 12, 1943. 32 pages.
2462. A Giemsa stain of quite constant composition and performance made in the laboratory from eosin and methylene blue. By R. D. Lillie. March 12, 1943. 4 pages.
2463. What's past is prologue. Academic qualifications of registered nurses as revealed by the 1941 National Survey of Registered Nurses. By Henrietta Landau. March 19, 1943. 13 pages.
2464. A comparison of rabbit and horse serums in meningococcus infections. By Sara E. Branham. March 19, 1943. 6 pages.

2465. Location and movement of physicians, 1923 and 1938. Age distribution in relation to county characteristics. By Joseph W. Mountin, Elliott H. Pennell, and Virginia Nicolay. March 19, 1943. 8 pages.
2466. Aqueous-base yellow fever vaccine. By M. V. Hargett, H. W. Burruss, and Anthony Donovan. March 26, 1943. 8 pages.
2467. Experimental chemotherapy of burns and shock. III. Effects of systemic therapy on early mortality. By Sanford M. Rosenthal. March 26, 1943. 10 pages.
2468. Distribution of health services in the structure of State government. Chapter X. State health department organization. By Joseph W. Mountin and Evelyn Flook. April 2, 1943. 36 pages.
2469. Notes on the relation between coliforms and enteric pathogens. By Robert W. Kehr and Chester T. Butterfield. April 9, 1943. 19 pages.
2470. The toxicity of lead azide. By Lawrence T. Fairhall, Wendell V. Jenrette, Stuart W. Jones, and E. A. Pritchard. April 9, 1943. 10 pages.
2471. American and Australian Q fevers: persistence of the infectious agents in guinea pig tissues after defervescence. By R. R. Parker and Edward A. Steinhaus. March 26, 1943. 5 pages.
2472. An outbreak of dermatitis from airplane engine covers. By Louis Schwartz and Samuel M. Peck. April 16, 1943. 7 pages; 2 plates.
2473. Murine typhus fever control. Typhus Fever Control Unit of the United States Public Health Service. By C. R. Eskey. April 16, 1943. 9 pages.
2474. Studies of the acute diarrheal diseases. X A. Cultural observations on the relative efficacy of sulfonamides in *Shigella dysenteriae* infections. By Albert V. Hardy, William Burns, and Thelma DeCapito. X B. A preliminary note on the clinical response to sulfadiazine therapy. By Albert V. Hardy and Sam D. Cummins. XI. The typing of *Shigella dysenteriae* Flexner. By Albert V. Hardy, James Watt, and Thelma DeCapito. April 30, 1943. 12 pages.
2475. Rocky Mountain spotted fever: spontaneous infection in the tick *Amblyomma americanum* By R. R. Parker, Glen M. Kohls, and Edward A. Steinhaus. May 7, 1943. 9 pages.
2476. Rocky Mountain spotted fever. Further experience in the therapeutic use of immune rabbit serum. By Norman H. Topping. May 14, 1943. 19 pages.
2477. An improved antigen for complement fixation in American trypanosomiasis. By Dorland J. Davis. May 14, 1943. 4 pages.
2478. A plan for rodent control in cities. By G. C. Sherrard. May 28, 1943. 8 pages.
2479. The bacteriostatic action of sulfadiazine on *E. typhosa* in carriers and cases. By Albert V. Hardy. May 28, 1943. 8 pages.
2480. Relapsing fever: the tick *Ornithodoros turicata* as a spirochetal reservoir. By Gordon E. Davis. May 28, 1943. 4 pages.
2481. Tularaemia: spontaneous occurrence in shrews. By Glen M. Kohls and Edward A. Steinhaus. May 28, 1943. 1 page.
2482 A blueprint for the conquest of hunger. By Thomas Parran. June 11, 1943. 8 pages.
2483. Dermatitis from resin glue in war industries. By Louis Schwartz, Samuel M. Peck, and John E. Dunn. June 11, 1943. 5 pages.
2484. Activities of State and local industrial hygiene services in a war year. By Victoria M. Trasko. June 11, 1943. 12 pages.
2485. The effect of arsenates on the storage of lead. By Lawrence T. Fairhall, John W. Miller, and F. Lloyd Weaver. June 18, 1943. 5 pages.

2486. Poliomyelitis in the United States in 1942, and a summary of its prevalence from 1933 to 1942, inclusive. By C. C. Dauer. June 18, 1943. 13 pages.
2487. Studies on the duration of disabling sickness. IV. Duration of disability from the nonrespiratory-nondigestive diseases among male employees with particular reference to the older worker. By William M. Gafafer and Rosedith Sitgreaves. June 25, 1943. 12 pages.
2488. The health officer's place in the management of mental illness. By Samuel W. Hamilton. June 25, 1943. 5 pages.
2489. American Q fever: experimental transmission by the Argasid ticks *Ornithodoros moubata* and *O. hermsi*. By Gordon E. Davis. June 25, 1943. 4 pages.

Supplements to the Public Health Reports

161. Ivy and sumac poisoning. Revised 1943. 8 pages; 2 plates.
*165. The pharmacology of the opium alkaloids. By Hugo Krueger, Nathan B. Eddy, and Margaret Sumwalt. Published in two volumes, cloth bound. Part 1, 1941, pages 1 to 811; part 2, 1943, pages 813 to 1448. $1.50 each part.
169. Deficiency stomatitis. By Harold R. Sandstead. 1943. 7 pages; 2 plates.
170. Follow-up study of treated narcotic drug addicts. By Michael J. Pescor. 1943. 18 pages.
171. Outline of an industrial hygiene program. 1943. 13 pages.
172. The notifiable diseases. Prevalence during 1941 in States. 1943. 13 pages.

Public Health Bulletin

184. Distribution of health services in the structure of State government. By Joseph W. Mountin and Evelyn Flook. Third edition, 1943. 332 pages.

National Institute of Health Bulletins

181. The toxicology of beryllium. By Frances Hyslop, Edward D. Palmes, William C. Alford, A. Ralph Monaco, and Lawrence T. Fairhall. 1943. 56 pages; 5 halftones.
182. Industrial manganese poisoning. By Lawrence T. Fairhall and Paul A. Neal. 1943. 24 pages.

Workers' Health Series

10. What You Don't Know *Can* Hurt You. 7 pages.

Workers' Health Posters

10. Jenny on the Job. Wears styles designed for victory.
11. Jenny on the Job. Eats man size meals.
12. Jenny on the Job. Gets her beauty sleep.
13. Jenny on the Job. Keeps fresh as a daisy.
14. Jenny on the Job. Has her fun after work.
15. Jenny on the Job. Steps ahead with low heels.
16. Jenny on the Job. Lifts weight the easy way.
17. Jenny on the Job. Let's keep our rest room clean.

Community Health Series

4. Malaria quiz for young Americans. 1943. 32 pages, illustrated.

Tuberculosis Folder

1. You're going to have your picture taken. 1943. 4 pages.

Unnumbered Publications

Index to Public Health Reports, volume 57, part 2, July–December 1942. 18 pages.
Index to Journal of the National Cancer Institute, volume 3, August 1942–June 1943. 10 pages.
Insert to Reprint No. 1697 "Control of Communicable Diseases," pages 56A and 56B. 1943.
National Negro Health Week Bulletin. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Twenty-ninth observance, April 4–11, 1943. 4 pages.
National Negro Health Week leaflet. Twenty-ninth observance, April 4–11, 1943. 2 pages.
National Negro Health Week poster. Twenty-ninth observance, April 4–11, 1943.

Reprints from Venereal Disease Information

190. Symptomatic neurosyphilis. By Robert R. Kierland, Paul A. O'Leary, and Eleanor Vandoren. Vol. 23, October 1942. 18 pages.
191. Law enforcement in venereal disease control from the standpoint of the health officer. By John H. Stokes. Vol. 23, November 1942. 10 pages.
192. Quantitative serologic studies in early syphilis. I. Treatment with artificial fever alone. By Walter M. Simpson, Donald L. Rose, and H. Worley Kendell. II. Treatment with artificial fever combined with chemotherapy. By H. Worley Kendell, Donald L. Rose, and Walter M. Simpson. III. Treatment with a single intensive session of combined fever-chemotherapy. By Donald L. Rose, Walter M. Simpson, and H. Worley Kendell. Vol. 23, November 1942. 13 pages.
193. A comparison of case-finding methods in a syphilis control program. By Henry Packer. Vol. 23, December 1942. 8 pages.
194. Preliminary report on the treatment of postarsenical dermatitis with histamine. By Edward C. Jenkins. Vol. 24, January 1943. 3 pages.
195. A comparative study of antigens of human pus, mouse brain, and chick embryo origin for the diagnosis of lymphogranuloma venereum. By Franco Mortara and Robert B. Greenblatt. Vol. 24, January 1943. 4 pages.
196. An experimental evaluation of intensive methods for the treatment of early syphilis. I. Toxicity and excretion. By Harry Eagle and Ralph B. Hogan. Vol. 24, February 1943. 12 pages.
197. An experimental evaluation of intensive methods for the treatment of early syphilis. II. Therapeutic efficacy and margin of safety. By Harry Eagle and Ralph B. Hogan. Vol. 24, March 1943. 11 pages.
198. The importance of diagnosis of gonorrhea in the woman in the control of this disease. By Adolph Jacoby. Vol. 24, March 1943. 4 pages.
199. Requirements of premarital legislation as they apply to the laboratories and commissioned medical officers of the armed services and of the United States Public Health Service. By J. F. Mahoney. Vol. 24, April 1943. 3 pages.

Venereal Disease Special Education Circular

4. Victory versus Vd. (revised edition). 20 pages.

Supplements to Venereal Disease Information

4. Directory of clinics for the diagnosis and treatment of venereal diseases. Revised 1943. 1943. 124 pages.

4-A. Directory of venereal disease clinics for foreign seamen. 1943. 18 pages.

DEATHS DURING WEEK ENDED SEPTEMBER 25, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 25, 1943	Corresponding week, 1942
Data for 90 large cities of the United States:		
Total deaths	8,300	7,727
Average for 3 prior years	7,563	
Total deaths, first 38 weeks of year	347,280	318,842
Deaths under 1 year of age	625	599
Average for 3 prior years	544	
Deaths under 1 year of age, first 38 weeks of year	24,881	21,717
Data from industrial insurance companies:		
Policies in force	65,848,572	65,043,991
Number of death claims	12,974	10,068
Death claims per 1,000 policies in force, annual rate	10.3	8.1
Death claims per 1,000 policies, first 38 weeks of year, annual rate	9.8	9.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 2, 1943

Summary

The incidence of poliomyelitis declined sharply for the second week. A total of 679 cases was reported, as compared with 818 for the preceding week, 1,020 for the next earlier week, and a 5-year (1938–42) median of 469. States reporting 18 or more cases (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 31 (29), Connecticut 32 (29), Missouri 22 (10), Oklahoma 22 (18), and Oregon 29 (18); *decreases*—Rhode Island 18 (20), New York 52 (57), Illinois 118 (140), Wisconsin 19 (22), Kansas 32 (52), Texas 26 (41), Utah 18 (42), Washington 19 (22), and California 98 (117). The cumulative total for the first 39 weeks of the year is 9,309, as compared with 2,835 for the same period last year and a 5-year (1938–42) median of 4,899 for the corresponding period.

A total of 192 cases of meningococcus meningitis was reported, the largest weekly total of the past 7 weeks, as compared with 178 for the preceding week, 48 for the corresponding week last year, and a 5-year median of 27. The largest comparable weekly figure during the past 16 years was that of 111 cases for the corresponding week of 1929. States reporting 10 or more cases for the current week (last week's figures in parentheses) are as follows: Massachusetts 10 (16), New York 31 (17), Pennsylvania 12 (15), Ohio 12 (5), Illinois 13 (19), and California 22 (14). The cumulative total for the first 39 weeks of the year is 14,523, as compared with 2,671 for the same period last year, a 5-year median of 1,602, and 8,177 for the same period in 1929, the largest comparable number of the past 16 years.

Of the other seven common communicable diseases included in the following table, seasonal increases were reported for diphtheria, influenza, measles, and scarlet fever. The current incidence is above the corresponding median for influenza, measles, and scarlet fever, but only for measles and whooping cough for the first 39 weeks of the year.

Deaths recorded for the week in 88 large cities of the United States aggregated 8,340, as compared with 8,258 last week and a 3-year (1940–42) average of 7,906. The cumulative total for the first 39 weeks of the year is 353,227, as compared with 324,730 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended October 2, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Oct. 2, 1943	Oct. 3, 1942		Oct. 2, 1943	Oct. 3, 1942		Oct. 2, 1943	Oct. 3, 1942		Oct. 2, 1943	Oct. 3, 1942	
NEW ENGLAND												
Maine	0	0	1	------	------	1	19	0	1	1	1	1
New Hampshire	0	0	0	1	------	------	1	0	0	1	0	0
Vermont	0	0	0	------	------	------	4	17	3	0	0	0
Massachusetts	9	8	3	------	------	------	66	40	52	10	3	1
Rhode Island	0	4	1	------	------	------	7	4	1	3	0	0
Connecticut	2	8	2	2	1	1	8	2	4	2	1	1
MIDDLE ATLANTIC												
New York	12	9	10	[1] 4	[1] 6	[1] 6	114	42	48	31	5	4
New Jersey	4	1	3	2	5	5	60	25	25	8	3	1
Pennsylvania	18	6	12	1	------	------	34	51	51	12	4	2
EAST NORTH CENTRAL												
Ohio	11	6	8	4	5	5	45	22	22	12	0	0
Indiana	28	4	9	2	14	11	4	7	4	8	0	0
Illinois	7	11	11	2	6	6	45	13	18	13	0	0
Michigan [3]	2	5	5	------	3	3	251	21	38	6	0	1
Wisconsin	2	1	0	9	34	33	99	48	48	4	0	0
WEST NORTH CENTRAL												
Minnesota	7	1	2	3	1	2	70	1	6	5	0	0
Iowa	10	7	7	------	------	------	2	12	6	0	0	0
Missouri	19	3	4	1	------	------	9	3	3	6	1	0
North Dakota	1	0	3	10	3	3	186	4	4	2	0	0
South Dakota	6	0	1	------	------	------	4	0	1	0	0	0
Nebraska	3	5	4	------	3	------	4	22	4	0	1	0
Kansas	4	2	4	5	9	2	7	5	6	3	0	0
SOUTH ATLANTIC												
Delaware	0	1	1	------	------	------	6	0	1	2	0	0
Maryland [2]	3	5	4	5	2	2	7	8	7	5	5	2
District of Columbia	0	1	1	------	------	------	1	0	2	2	0	0
Virginia	16	20	20	53	111	41	27	7	7	3	4	3
West Virginia	10	8	8	------	3	7	13	2	2	1	2	1
North Carolina	38	76	76	7	------	2	9	5	11	1	0	0
South Carolina	25	31	41	141	171	171	15	2	2	1	3	1
Georgia	29	25	37	41	28	20	5	3	10	0	0	0
Florida	5	7	7	4	------	4	1	2	2	4	0	1
EAST SOUTH CENTRAL												
Kentucky	15	12	14	3	2	2	2	0	12	4	0	0
Tennessee	23	24	24	7	19	19	2	6	5	1	0	0
Alabama	29	18	39	35	19	7	11	1	7	0	0	0
Mississippi [2]	7	10	11	------	------	------	------	------	------	0	0	0
WEST SOUTH CENTRAL												
Arkansas	5	17	17	9	29	23	1	8	8	0	0	0
Louisiana	5	6	6	1	5	5	1	2	2	2	0	1
Oklahoma	5	9	9	11	10	12	4	1	1	1	1	0
Texas	32	49	34	456	379	108	17	4	13	0	1	2
MOUNTAIN												
Montana	0	4	0	1	1	1	51	1	14	1	0	0
Idaho	0	1	0	------	------	------	6	23	2	2	0	0
Wyoming	0	1	1	------	16	------	1	12	3	0	0	0
Colorado	3	17	5	16	19	13	15	8	8	3	0	0
New Mexico	1	5	3	------	1	------	0	0	1	0	0	0
Arizona	3	2	2	55	31	36	5	3	3	2	0	0
Utah [3]	0	0	0	------	------	------	2	54	2	0	1	0
Nevada	0	1	------	------	------	------	3	2	------	0	0	------
PACIFIC												
Washington	6	2	2	1	1	------	16	87	9	4	8	0
Oregon	1	3	3	1	5	7	22	30	14	4	3	0
California	19	17	14	12	17	15	92	42	72	22	6	1
Total	425	448	448	905	959	800	1,374	647	668	192	48	27
39 weeks	9,063	9,374	10,350	85,825	84,770	154,152	542,892	470,048	470,048	14,523	2,671	1,602

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 2, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Oct. 2, 1943	Oct. 3, 1942		Oct. 2, 1943	Oct. 3, 1942		Oct. 2, 1943	Oct. 3, 1942		Oct. 2, 1943	Oct. 3, 1942	
NEW ENGLAND												
Maine	3	1	1	14	4	4	0	0	0	2	3	0
New Hampshire	0	0	0	0	6	1	0	0	0	0	0	0
Vermont	0	3	0	2	2	4	0	0	0	0	1	0
Massachusetts	31	1	4	173	94	40	0	0	0	7	11	1
Rhode Island	18	0	0	6	3	3	0	0	0	0	0	0
Connecticut	32	3	3	11	25	17	0	0	0	0	1	2
MIDDLE ATLANTIC												
New York	52	20	21	131	112	93	0	0	0	19	12	18
New Jersey	7	9	9	30	32	32	0	0	0	0	2	5
Pennsylvania	8	5	13	87	80	80	0	0	0	13	17	17
EAST NORTH CENTRAL												
Ohio	12	7	7	183	77	93	0	0	0	9	5	12
Indiana	7	3	4	25	35	35	0	0	0	3	1	7
Illinois	118	37	31	87	76	85	0	0	0	1	14	21
Michigan [2]	15	16	26	63	51	62	0	0	1	3	6	4
Wisconsin	19	1	8	88	57	61	0	1	0	4	1	2
WEST NORTH CENTRAL												
Minnesota	9	5	16	32	28	37	1	0	0	0	0	2
Iowa	16	5	5	28	37	26	0	0	0	0	1	1
Missouri	22	3	3	34	32	25	0	0	0	3	7	13
North Dakota	1	1	0	7	3	10	1	0	0	3	0	0
South Dakota	0	0	1	9	5	5	0	0	0	0	0	0
Nebraska	8	15	7	10	14	12	0	0	0	0	0	0
Kansas	32	9	4	57	29	44	0	0	0	0	2	4
SOUTH ATLANTIC												
Delaware	0	2	0	1	3	3	0	0	0	1	1	0
Maryland [2]	3	1	1	18	17	17	0	0	0	3	7	8
District of Columbia	1	0	1	10	14	8	0	0	0	1	0	1
Virginia	8	2	3	46	41	36	0	0	0	8	6	18
West Virginia	4	0	1	72	43	43	0	0	0	15	2	15
North Carolina	0	8	4	111	78	78	0	0	0	1	2	6
South Carolina	1	3	3	12	13	13	0	0	0	6	2	14
Georgia	1	2	1	21	36	26	0	0	0	2	13	13
Florida	0	1	1	5	1	4	0	0	0	1	5	4
EAST SOUTH CENTRAL												
Kentucky	7	3	6	47	29	47	0	0	0	6	5	14
Tennessee	0	7	4	47	75	49	0	0	0	5	14	12
Alabama	2	1	1	17	32	30	0	0	0	1	4	4
Mississippi [2]	1	1	1	6	18	11	0	0	0	2	2	5
WEST SOUTH CENTRAL												
Arkansas	0	7	1	2	4	9	0	0	0	1	8	10
Louisiana	1	2	2	6	6	5	0	0	0	5	4	16
Oklahoma	22	2	2	10	10	13	0	0	0	3	7	7
Texas	26	4	4	22	32	24	2	0	1	12	22	34
MOUNTAIN												
Montana	3	0	0	21	10	10	0	0	0	0	1	1
Idaho	0	0	1	7	10	7	0	0	0	2	0	1
Wyoming	1	5	1	5	2	2	0	0	0	1	0	0
Colorado	17	2	1	14	10	19	0	0	0	4	2	2
New Mexico	3	1	1	5	1	1	0	0	0	7	9	6
Arizona	3	1	0	6	2	2	0	0	0	4	3	3
Utah [2]	18	1	1	16	7	5	0	0	0	1	0	0
Nevada	1	0	------	6	0	------	0	0	------	0	1	------
PACIFIC												
Washington	19	0	0	37	19	19	0	0	0	2	2	4
Oregon	29	0	0	13	3	9	1	0	0	1	0	6
California	98	17	13	96	67	72	0	0	1	6	7	7
Total	679	217	469	1,756	1,385	1,385	5	1	9	168	213	383
39 weeks	9,309	2,835	4,899	104,359	94,716	122,665	630	840	2,020	4,352	5,350	7,441

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 2, 1943 and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended Oct. 2, 1943								
	Week ended—		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Oct. 2, 1943	Oct. 3, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	16	36	27	0	0	0	0	0	0	0	0	0
New Hampshire	1	2	0	0	0	0	0	0	0	0	0	0
Vermont	12	17	15	0	0	0	0	0	0	0	0	0
Massachusetts	82	113	104	0	0	14	0	1	0	0	0	0
Rhode Island	61	26	24	0	0	0	0	0	0	0	0	0
Connecticut	10	38	38	0	0	20	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	176	329	329	0	2	196	0	6	0	1	0	0
New Jersey	81	133	133	0	0	3	0	1	0	0	0	0
Pennsylvania	186	250	250	1	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	104	129	184	0	2	2	0	0	0	0	0	0
Indiana	34	30	21	0	0	0	0	0	0	0	0	0
Illinois	145	166	166	0	3	7	0	3	0	1	0	0
Michigan [2]	191	193	243	0	0	14	0	0	0	0	0	0
Wisconsin	220	187	187	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	52	34	45	0	0	0	0	0	0	0	0	0
Iowa	27	23	16	0	0	0	0	0	0	0	0	0
Missouri	23	5	19	0	0	0	5	0	0	1	1	0
North Dakota	13	22	22	0	0	0	2	0	0	0	1	0
South Dakota	14	0	2	0	0	0	0	0	0	0	0	0
Nebraska	16	7	7	0	0	0	0	0	0	0	0	0
Kansas	28	22	41	0	0	0	0	1	0	0	1	0
SOUTH ATLANTIC												
Delaware	6	0	8	0	0	0	0	0	0	0	0	0
Maryland [2]	64	64	53	0	0	0	9	0	0	0	0	0
District of Columbia	9	6	17	0	0	0	0	0	0	0	0	0
Virginia	59	19	45	0	0	0	158	0	0	0	0	4
West Virginia	6	7	25	0	0	0	0	0	0	0	0	0
North Carolina	105	35	99	0	0	0	0	0	0	0	0	2
South Carolina	39	22	22	0	0	9	0	0	0	0	0	5
Georgia	26	10	10	0	2	5	0	0	0	0	0	44
Florida	21	3	5	0	1	2	0	0	0	0	0	3
EAST SOUTH CENTRAL												
Kentucky	33	26	52	0	0	0	0	0	0	0	0	0
Tennessee	21	29	29	0	0	0	3	0	0	0	0	0
Alabama	25	8	20	0	0	0	0	0	0	0	0	21
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	1
WEST SOUTH CENTRAL												
Arkansas	20	3	6	0	0	7	0	0	0	0	0	0
Louisiana	5	3	7	0	1	11	0	0	0	0	0	10
Oklahoma	3	3	7	0	0	0	0	0	0	1	0	0
Texas	123	104	99	0	40	167	0	1	0	0	0	40
MOUNTAIN												
Montana	10	28	7	0	0	0	0	0	0	0	0	0
Idaho	2	1	2	0	0	0	0	0	0	0	0	0
Wyoming	4	11	3	0	0	0	5	0	0	0	0	0
Colorado	32	19	23	0	0	0	0	0	0	0	0	0
New Mexico	1	26	24	0	0	1	0	0	0	0	0	0
Arizona	9	3	12	0	0	0	9	0	0	0	0	0
Utah [2]	24	21	21	0	0	0	0	0	0	0	1	0
Nevada	0	0	------	0	0	2	0	0	0	0	0	0
PACIFIC												
Washington	71	18	33	0	0	0	0	0	0	0	0	0
Oregon	32	6	9	0	0	0	0	0	0	0	0	0
California	141	213	202	0	1	10	0	1	0	0	0	0
Total	2,333	2,450	2,611	1	52	470	191	14	0	4	5	130
39 weeks	147,659	139,386	141,753	49	1,634	12,884	3,228	554	19	414	656	3,076
39 weeks, 1942	------	------	------	63	853	9,633	5,475	429	36	434	721	2,587

[1] New York City only.
[2] Period ended earlier than Saturday
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 6; New York, 1; South Carolina, 1; Georgia, 1; Louisiana, 1; Texas, 1; New Mexico, 1; California, 5.

NOTIFIABLE DISEASES, SECOND QUARTER 1943

The figures in the following table are the totals of the monthly morbidity reports received from the State health authorities for April, May, and June 1943, and are preliminary and therefore incomplete. The comparisons made are with similar preliminary reports. Each State health officer has been requested to include in the monthly report for his State all diseases that are required by law or regulation to be reported in the State. The lists of diseases required to be reported are not the same for each State, although the common communicable diseases are notifiable in all the States. Certain diseases, however, may be a health problem in some States but not in others. There are variations among the States also in the degree of completeness of reporting of cases. As compared with the deaths, incomplete case reports are obvious for such diseases as malaria, pellagra, pneumonia, and tuberculosis, while in many States other diseases, such as puerperal septicemia and Vincent's infection, are not reportable.

In spite of these known deficiencies, however, these monthly reports, which are published quarterly and annually in consolidated form, have proved of value in presenting early information regarding the reported incidence of a large group of diseases and in indicating a trend by providing a comparison with similar preliminary figures for prior years. To some extent they also give a picture of the geographic prevalence of certain diseases, as the States are arranged by geographic location.

Leaders are used in the table to indicate that no case of the disease was reported.

Consolidated monthly State morbidity reports for April, May, and June 1943

Division and State	Anthrax	Chickenpox	Diphtheria	Dysentery, amebic	Dysentery, bacillary	Dysentery, undefined	Encephalitis, infectious	German measles	Hookworm disease	Influenza	Malaria	Measles	Meningitis, meningococcus	Mumps	Ophthalmia neonatorum	Pellagra	Pneumonia, all forms	Poliomyelitis
NEW ENGLAND																		
Maine	--------	839	6	--------	1	--------	--------	569	--------	8	--------	836	73	698	--------	--------	114	--------
New Hampshire	--------	45	1	--------	--------	--------	--------	719	--------	3	--------	392	25	74	--------	--------	23	2
Vermont	--------	447	--------	--------	--------	--------	--------	2,848	--------	--------	1	3,702	7	208	--------	--------	13	1
Massachusetts	2	3,269	19	--------	17	--------	11	20,416	--------	--------	24	19,594	331	2,025	68	--------	[1] 821	6
Rhode Island	--------	239	6	--------	--------	--------	1	1,704	--------	5	--------	906	127	474	1	--------	91	2
Connecticut	--------	1,809	14	2	23	--------	4	10,714	--------	21	3	4,844	122	2,508	--------	--------	746	4
MIDDLE ATLANTIC																		
New York	2	8,673	116	67	210	--------	21	[3] 9,961	--------	[3] 124	19	41,309	805	[2] 2,979	38	--------	6,015	17
New Jersey	3	6,950	50	9	1	2	5	39,054	--------	133	3	25,372	337	8,778	3	--------	1,255	5
Pennsylvania	3	8,338	135	2	4	--------	9	24,970	--------	19	1	21,139	418	6,630	10	3	1,388	9
EAST NORTH CENTRAL																		
Ohio	--------	3,440	134	2	1	--------	14	5,464	--------	156	11	7,305	172	3,223	152	1	871	2
Indiana	--------	1,038	53	6	--------	1	--------	1,870	--------	206	71	5,603	115	1,278	--------	1	386	4
Illinois	--------	3,860	263	6	7	4	[3] 13	7,937	--------	157	18	19,516	259	2,848	100	--------	2,741	4
Michigan	--------	5,946	66	3	17	--------	1	3,825	--------	184	127	37,291	287	3,225	3	--------	1,135	3
Wisconsin	--------	8,232	17	--------	--------	--------	3	31,626	--------	370	7	27,416	71	6,042	--------	--------	[1] 608	5

See footnotes at end of table.

Consolidated monthly State morbidity reports for April, May, and June 1943—Continued

Division and State	Anthrax	Chickenpox	Diphtheria	Dysentery, amebic	Dysentery, bacillary	Dysentery, undefined	Encephalitis, infectious	German measles	Hookworm disease	Influenza	Malaria	Measles	Meningitis, meningococcus	Mumps	Ophthalmia neonatorum	Pellagra	Pneumonia, all forms	Poliomyelitis
WEST NORTH CENTRAL																		
Minnesota		2,280	55	24	2	2				21		4,337	37				155	1
Iowa		602	34				1	2,332		10	3	2,632	27	1,045			102	
Missouri		578	22	11		2	2			32	38	4,038	250	846	1		360	5
North Dakota		241	6		1		1			162	1	1,061	6	460			445	
South Dakota		107	3				1					1,655	6	63			24	
Nebraska		433	13							66		2,259	11	1,141			56	1
Kansas	1	1,040	34	4	2		8	2,503		33	2	4,608	53	1,791		1	282	12
SOUTH ATLANTIC																		
Delaware		158	1									1,165	27	62			5	
Maryland		1,565	41		5	1	1	2,823		53	2	2,512	181	976			709	1
District of Columbia		351	1	4	3					10	30	1,169	56	254		1	276	
Virginia		1,343	40	2		607	1			2,358	28	4,812	255	2,266		10	1,222	5
West Virginia		449	34				1			203		1,073	53	317		1	54	4
North Carolina		1,203	70	2	5					110	65	3,032	200			5	269	3
South Carolina		694	112	1	131		[4] 7	1,330	171	4,180	2,372	1,804	114	1,538	6	209	1,620	2
Georgia		373	36	9	120	25	2		775	423	131	2,576	65	727		22	458	2
Florida		1,177	31	28	8		3	885	1,250	177	25	853	104	1,257	6	18	429	3
EAST SOUTH CENTRAL																		
Kentucky		404	41	1	20		2	814		93	12	2,609	142	523		1	151	10
Tennessee		306	38			36	3	831		478	57	3,704	150	935	6	22	694	2
Alabama	2	349	45	3			4	661		1,381	553	2,120	95	697		23	934	7
Mississippi		1,887	58	335	4,997				847	6,094	7,656	3,239	147	3,165	33	846	2,637	5
WEST SOUTH CENTRAL																		
Arkansas		581	50	14	119			755		242	276	1,416	60	278		13	612	13
Louisiana	1	145	37	13	60			182	72	62	46	936	59	453		2	523	8
Oklahoma		257	40	3	9		1		39	405	510	1,125	40	235	2	18	270	26
Texas	2	3,811	291	331	2,417		13			8,365	2,281	7,831	178	3,130	19	283	3,399	110
MOUNTAIN																		
Montana		453	10		3	1	2			121		2,105	5	911			34	
Idaho		86	47				1	582		17	1	735	72	1,192			33	1
Wyoming		158	1	2			1	56		193	1	1,657	11	676			33	1
Colorado		1,394	106	3	18		2			410	9	6,203	38	1,722			483	5
New Mexico		149	7		5	4	([4])	63		35	1	202	6	87		2	301	4

See footnotes at end of table.

Arizona		433	16	5		358		201		749	4	514	23	556	2	2	414	30
Utah		1,875	3	1		2	1	1,773		106	32	2,126	46	622			306	7
Nevada		53	1	1	1							208	7	108			29	
PACIFIC																		
Washington		2,412	76	3			13	3,538		76		5,579	93	2,326			299	13
Oregon		551	21	4						322	10	3,140	84	1,190			357	2
California		15,632	221	31	135		15	18,965		907	370	13,873	467	10,590			[1] 1,233	332
1943	16	96,805	2,522	935	8,354	1,045	168	200,004	3,154	29,370	14,806	314,283	6,407	83,139	459	1,475	35,506	680
1942	22	96,427	2,338	726	7,633	3,309	134	76,053	4,769	24,028	15,816	265,669	1,076	107,127	437	1,971	28,517	272
Median, 1938–42	18	81,547	2,856	796	7,495	357	140		6,683	24,028	17,273	265,669	559	53,395	437	2,817	31,430	368
Alaska		45						106		755		129	7	89			88	
Hawaii Territory		770	25	6	16		1	114	15	1,495	23	44	9	1,426			[1] 52	59
Panama Canal Zone [6]		63	30	13	4						806	39	3	297				

Division and State	Puerperal septicemia	Rabies in animals	Rabies in man	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tuberculosis, all forms	Tuberculosis, respiratory	Tularemia	Typhoid and paratyphoid fever	Paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
NEW ENGLAND																			
Maine					197						157	137		7			2	7	501
New Hampshire					95	6					96			4			1		61
Vermont					130			1			29						13	6	196
Massachusetts					5,974	43		3	4	1	970	906		64	52		13		1,606
Rhode Island		1			367	35		1			222	215		3					458
Connecticut				1	1,183	54		2		4	401	382		7	5		17		458
MIDDLE ATLANTIC																			
New York		48		2	6,035	291		12		35	3,530	3,351	2	75	20	3	59		3,543
New Jersey				2	1,503	44	1	5	2	8	1,140			15	4		17		2,133
Pennsylvania			1	2	3,200					1	1,557		1	48		1	21		3,203
EAST NORTH CENTRAL																			
Ohio				3	2,570	53	76	5	10		1,326	1,209	1	37	4		19	17	1,942
Indiana				2	919	2	17	2			980	785		17		1	22	205	898
Illinois		161	2	2	1,901	126	5	8	30	1	2,372	2,174	16	24	5		102	55	1,712
Michigan		1			1,413	143	9	5	2		1,719			35	7		40	54	3,388
Wisconsin					4,086	5	2				639		3	4			65		3,168

See footnotes at end of table.

Consolidated monthly State morbidity reports for April, May, and June 1943—Continued

Division and State	Puerperal septicemia	Rabies in animals	Rabies in man	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tuberculosis, all forms	Tuberculosis, respiratory	Tularemia	Typhoid and paratyphoid fever	Paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
WEST NORTH CENTRAL																			
Minnesota				1	657	1,205		2	1		470		4	5			65		1,072
Iowa		5		3	480	29	11				159	159		7			100		513
Missouri			1	2	1,109		4		125		659		4	22	4		15	13	396
North Dakota					49	4	1		9		72	29	2	2			5	25	87
South Dakota				3	135	11	5	2	3		64			2			1		64
Nebraska					361		4				41			1					170
Kansas		3			497	17	4	1	1		188	123	4	13	1		44	38	1,127
SOUTH ATLANTIC																			
Delaware				5	48						22	22		4			1		45
Maryland		3		23	1,172	50		6	1	1	1,050	688		18			4	21	1,508
District of Columbia		15			178						641	617		25	15				312
Virginia				9	422	171					1,271	1,271	5	34	3	1	8		1,708
West Virginia				4	250	13	2				527			32	1				866
North Carolina				6	294	14	5				533	519	4	17		21	1		2,919
South Carolina		48			54	2	1	3			159		7	14	4	8	5		841
Georgia					120	65	1	10		5	573	571	26	63	20	142	31	60	758
Florida		22			70	6	1	5			370		1	36	9	80	17	62	303
EAST SOUTH CENTRAL																			
Kentucky					383	17	6		8		575	572	1	29	1		6		523
Tennessee	4		1	5	359	47	6	8	3		956		19	25	3	2	17	80	897
Alabama		38			148		5	12			792		3	20	1	80	21		872
Mississippi	45			2	128		6		18		450	437	27	35		22	15		4,800
WEST SOUTH CENTRAL																			
Arkansas		56			98	92	14		100		270	241	50	30	1	2	4		502
Louisiana		52	2		75	13	1	5			773	770	5	54	5	29	11		113
Oklahoma	1		1	2	190	59	2		31		510		7	8		2	6		485
Texas			1	1	686	104	35		18		2,002		18	96	13	213	91		7,672

MOUNTAIN																			
Montana				23	109	17	1				113		30	2				13	313
Idaho				8	828	1	2				24	7		4					38
Wyoming				22	479	7			13		11		5	2			1	2	34
Colorado		3		9	698	5	5				449		5	22	2	1	10		314
New Mexico	5	19		3	69	4			16		185	162	2	13			7		171
Arizona					137	67			118		367			4	1		5		274
Utah				9	380	2	1	2	1		36	32	13	8			2		868
Nevada					15	9	1		6		18		1	1			2	32	21
PACIFIC																			
Washington				2	390	44	2		6		619	597	1	7		[7] 1	13	56	523
Oregon				9	236	9	7	1	6		161		3	9			5	37	319
California		253	1	3	2,144		2	16	39	4	2,849	2,738	4	52	23	4	54		5,783
1943	55	728	10	168	43,121	2,886	245	112	571	60	33,157	18,804	230	1,056	204	613	958	873	60,568
1942	40	591	5	191	33,871	1,470	262	110	699	95	26,800	13,502	245	1,317		464	826	251	51,886
Median, 1938-42	90	866	9	192	42,632	2,642	846	110	699	95	28,024	14,944	227	1,677		353	968	484	51,886
Alaska					19						70	69		1					24
Hawaii Territory					20	3		5	5					2	1	18			718
Panama Canal Zone [6]					2									2	2				

[1] Lobar pneumonia only.
[2] New York City only.
[3] 17 cases of post-infectious encephalitis were also reported.
[4] 1 case of unspecified encephalitis was also reported.
[5] 2 cases of unspecified encephalitis were reported.
[6] Including the cities of Panama and Colon.
[7] Epidemic typhus fever. Imported case.

Actinomycosis: Connecticut, 1; Ohio, 2; Minnesota, 10; South Dakota, 1; Nevada, 1.
American Q fever: Montana, 1.
Botulism: Washington, 2; California, 1.
Coccidioidomycosis: Arizona, 57; California, 6.
Conjunctivitis: Massachusetts, 118 (suppurative); Rhode Island, 2 (kerato); Connecticut, 34 (infectious); Illinois, 15 (kerato); Michigan, 129 (kerato); Missouri, 2; North Dakota, 6 (includes 4 kerato); South Dakota, 6; Kansas, 1 (kerato); Maryland, 15; Georgia, 2; Florida, 5; Tennessee, 8 (kerato); Oklahoma, 1; Idaho, 6; Wyoming, 1 (kerato); New Mexico, 2; Utah, 1 (kerato); California, 10 (includes ophthalmia neonatorum); Hawaii Territory, 5.
Dengue: South Carolina, 2; Mississippi, 4; Texas, 5; California, 1; Hawaii Territory, 1.
Diarrhea and enteritis: New Jersey, 6 (diarrhea of newborn); Ohio, 46; Michigan, 34 (diarrhea of newborn); Maryland, 15 (diarrhea only); South Carolina, 3,510 (diarrhea only); Florida, 9 (infant diarrhea); Wyoming, 11 (diarrhea only); New Mexico, 23; Nevada, 41 (infant diarrhea); California, 81 (diarrhea of newborn).
Dog bite: Illinois, 4,725 (all animals); Michigan, 2,603.
Food poisoning: Ohio, 59; Illinois, 13; Louisiana, 2; New Mexico, 4; Arizona, 6; Nevada, 2; Washington, 133; California, 545.
Granuloma: Ohio, 2 (unspecified); Tennessee, 16 (inguinale); Mississippi, 191 (inguinale) Louisiana, 31 (inguinale); Arizona, 6 (inguinale); Washington, 7 (inguinale).
Impetigo contagiosa: Ohio, 54; Illinois, 10; Michigan, 227; Kansas, 14; Maryland, 3; Florida, 17; Oklahoma, 1; Washington, 2; Oregon, 94; Hawaii Territory, 78.
Jaundice: Minnesota, 2; Florida, 7; California, 28.
Leprosy: Massachusetts, 1; Pennsylvania, 1; Minnesota, 1; Florida, 1; Louisiana, 1; California, 4; Hawaii Territory, 11; Panama Canal Zone, 2.
Lymphocytic choriomeningitis: Massachusetts, 1.
Lymphogranuloma venereum: Missouri, 2; Tennessee, 28; Louisiana, 61; Arizona, 4.
Plague (human): Hawaii Territory, 2.
Psittacosis: Pennsylvania, 1.
Rat bite fever: Oklahoma, 1.
Relapsing fever: Texas, 12; Nevada, 1; California, 2.
Rheumatic fever: Illinois, 86; Michigan, 17; Georgia, 27; Wyoming, 2; Arizona, 3; Utah, 7; California, 125.
Scabies: Michigan, 117; Kansas, 26; Maryland, 1; Florida, 60; Oklahoma, 16; Idaho, 1; Oregon, 131.
Silicosis: Ohio, 2; New Mexico, 1.
Weil's disease: Massachusetts, 1; Utah, 1; Hawaii Territory, 22.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 18, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	2	2	0	1	2	0	0	6
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	6	5	9	10	14	0	1	24
Fall River	0	0	------	0	0	0	0	1	1	0	0	5
Springfield	0	0	------	0	3	0	0	0	6	0	0	2
Worcester	0	0	------	0	1	0	4	0	15	0	0	7
Rhode Island:												
Providence	0	0	------	0	17	1	1	7	5	0	0	141
Connecticut:												
Bridgeport	0	0	------	0	0	1	0	4	1	0	0	0
Hartford	1	0	------	0	0	1	0	1	2	0	0	4
New Haven	0	0	------	0	1	1	1	3	0	0	0	4
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	2	1	5	6	6	0	1	6
New York	4	0	------	0	43	6	33	37	26	0	3	87
Rochester	0	0	------	0	0	0	3	0	5	0	0	9
Syracuse	0	0	------	0	2	0	3	0	0	0	0	20
New Jersey:												
Camden	1	0	------	0	0	0	1	0	0	0	0	1
Newark	0	0	------	0	0	2	2	2	3	0	1	31
Trenton	0	0	1	0	0	1	0	0	0	0	1	1
Pennsylvania:												
Philadelphia	3	1	------	0	4	7	13	5	8	0	1	55
Pittsburgh	0	0	------	0	4	1	3	0	11	0	0	20
Reading	0	0	------	0	1	0	1	0	0	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	0	0	2	1	12	0	0	12
Cleveland	1	0	------	0	0	1	6	2	27	0	1	33
Columbus	0	0	------	0	0	0	1	1	4	0	0	6
Indiana:												
Fort Wayne	0	0	------	0	0	0	0	3	1	0	0	0
Indianapolis	1	0	------	0	0	0	7	0	3	0	2	15
South Bend	0	0	------	0	1	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	3	0	1	0	2	4	15	122	17	0	3	64
Springfield	0	0	------	0	0	1	0	0	0	0	0	0
Michigan:												
Detroit	2	0	------	0	3	4	9	6	14	0	0	57
Flint	1	0	------	0	0	0	0	0	0	0	0	0
Grand Rapids	0	0	------	1	4	0	1	1	0	0	0	5
Wisconsin:												
Kenosha	0	0	------	0	1	0	0	0	1	0	0	6
Milwaukee	0	1	1	1	4	0	4	5	7	0	1	85
Racine	0	0	------	0	2	0	0	0	1	0	0	6
Superior	0	0	------	0	12	0	0	0	0	1	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	0	0	1	0	2	0	0	8
Minneapolis	0	0	------	0	1	0	1	5	5	0	0	6
St. Paul	6	0	------	0	5	0	1	2	2	0	0	22
Missouri:												
Kansas City	0	0	------	0	1	0	1	1	3	0	0	6
St. Louis	1	1	------	0	0	2	7	2	6	0	3	5
North Dakota:												
Fargo	0	0	------	0	4	0	0	0	0	0	0	0
Nebraska:												
Omaha	1	0	------	0	0	0	3	6	5	0	0	0

City reports for week ended September 18, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—Continued												
Kansas:												
Topeka	0	0	------	0	1	0	0	1	2	0	2	3
Wichita	0	0	------	0	0	1	3	2	1	0	0	2
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	0	0	0	0	0	0
Maryland:												
Baltimore	0	0	------	0	1	1	7	1	3	0	1	68
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	1	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	1	1	6	2	4	0	1	14
Virginia:												
Lynchburg	0	0	------	0	12	0	0	0	2	0	0	4
Richmond	0	0	------	1	0	1	2	0	4	0	0	0
Roanoke	1	0	------	0	0	0	0	0	1	0	0	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	2	0	0	0
Wheeling	0	0	------	0	0	0	1	0	0	0	0	7
North Carolina:												
Wilmington	2	0	------	0	0	0	0	0	0	0	0	0
Winston-Salem	0	0	------	0	0	0	1	0	3	0	0	4
South Carolina:												
Charleston	0	1	3	0	0	1	0	0	0	0	0	0
Georgia:												
Atlanta	0	0	13	0	0	0	2	1	9	0	2	0
Brunswick	0	0	------	0	0	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	1	2	1	0	0	1
Florida:												
Tampa	0	0	------	0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	2	0	0	2	0	2	0	0	10
Nashville	1	0	------	1	1	0	1	0	2	0	0	4
Alabama:												
Birmingham	0	0	1	0	1	0	1	0	4	0	0	1
Mobile	0	0	------	1	0	2	3	0	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	2	0	0	0	0	0
Louisiana:												
New Orleans	2	0	6	1	0	1	6	4	3	0	3	1
Shreveport	0	0	------	0	0	0	1	0	0	0	0	0
Texas:												
Dallas	1	0	------	0	0	0	1	4	2	0	1	5
Galveston	0	0	------	0	0	0	1	1	0	0	0	0
Houston	0	0	------	1	0	0	2	2	0	0	0	5
San Antonio	0	0	1	0	0	0	3	1	0	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	1	2	0	0	0	4
Great Falls	0	0	------	0	5	0	0	1	0	0	0	5
Helena	0	0	------	0	0	0	0	0	1	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	1	0	0	1
Colorado:												
Denver	2	0	2	0	0	0	5	5	2	0	0	25
Pueblo	0	0	------	0	0	0	0	15	1	0	0	5
Utah:												
Salt Lake City	0	0	------	0	4	0	2	13	0	0	1	15

City reports for week ended September 18, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	3	0	------	0	7	2	1	2	3	0	0	5
Spokane	0	0	------	0	2	0	1	1	4	0	0	10
Tacoma	0	0	------	0	1	0	0	3	2	0	0	2
California:												
Los Angeles	7	0	3	2	3	1	4	26	10	0	0	26
Sacramento	0	1	------	0	0	0	3	5	1	0	0	0
San Francisco	2	0	1	0	4	0	3	6	7	0	0	18
Total	46	5	33	11	170	52	207	334	293	1	29	1,005
Corresponding week, 1942	51	1	45	12	118	24	242	68	281	0	24	1,214
Average, 1938–42	64	------	43	[1] 9	[2] 132	------	[1] 216	------	295	1	47	1,117

Dysentery, amebic.—Cases: New Haven, 1; New York, 1; St. Louis, 1.
Dysentery, bacillary.—Cases: Providence, 1; Buffalo, 19; New Haven, 4; New York, 5; Rochester, 1; Chicago, 1; Detroit, 5; St. Louis, 1; Baltimore, 5; Charleston, S. C., 4; Atlanta, 1; Nashville, 1; Los Angeles, 7.
Dysentery, unspecified.—Cases: Baltimore, 8; Richmond, 4; San Antonio, 1; Denver, 1.
Rocky Mountain spotted fever.—Cases: New York, 1.
Tularemia.—Cases: Richmond, 1.
Typhus fever.—Cases: New York, 1; Atlanta, 4; Savannah, 3; Memphis, 2; Nashville, 1; Birmingham, 2; New Orleans, 5; Shreveport, 4; Dallas, 3.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,643,500)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	2.5	0.0	0.0	0.0	74.9	27.5	39.9	67.4	114.8	0.0	2.5	482
Middle Atlantic	3.6	0.4	0.4	0.0	25.0	8.0	28.5	22.3	26.3	0.0	3.1	103
East North Central	4.7	0.6	1.2	1.2	16.9	5.8	26.3	82.3	50.8	0.6	4.1	169
West North Central	16.0	2.0	0.0	0.0	24.1	6.0	34.1	38.1	52.1	0.0	10.0	104
South Atlantic	5.1	1.7	27.4	1.7	25.7	6.8	37.7	10.3	49.7	0.0	6.8	168
East South Central	5.9	0.0	5.9	23.8	11.9	11.9	41.6	0.0	53.5	0.0	0.0	89
West South Central	8.8	0.0	20.5	5.9	0.0	2.9	46.9	35.2	14.7	0.0	11.7	32
Mountain	16.1	0.0	16.1	0.0	72.4	0.0	64.3	289.4	40.2	0.0	8.0	442
Pacific	21.0	1.7	7.0	3.5	29.7	5.2	21.0	75.2	47.2	0.0	0.0	107
Total	6.9	0.8	5.0	1.7	25.6	7.8	31.2	50.3	44.1	0.2	4.4	151

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in tissue and pools of fleas from rodents collected in California on the dates given as follows:

Eldorado County: September 1, tissue from 1 ground squirrel, *C. beecheyi*, taken at Tallac, Lake Tahoe.

Inyo County: July 22, 51 fleas from 38 ground squirrels, *C. beldingi*, taken at South Lake Resort, 14 miles west of Big Pine.

Mono County: July 31, 86 fleas from 43 golden mantled ground squirrels taken from the premises of Crestview Lodge, 1 mile east and 4 miles south of June Lake, and 40 fleas from 21 golden mantled ground squirrels taken at a ranch 5 miles east and 2 miles south of June Lake; August 12, 73 fleas from 21 chipmunks taken from the premises of June Lake Lodge, at June Lake.

Monterey County: July 15, 200 fleas from 16 ground squirrels, *C. beecheyi*, taken 10 miles south and 14 miles east of Monterey.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—Information dated September 27, 1943, states that a total of 283 cases of dengue fever, with 1 death, has occurred in Honolulu to date.

Plague (rodent).—A mouse found on August 23, 1943, in the Honokaa area, Hamakua District, Island of Hawaii, T. H., has been proved positive for plague.

FOREIGN REPORTS

BRAZIL

Rio Grande do Sul State—Poliomyelitis.—A report dated September 14, 1943, states that a mild epidemic of poliomyelitis has occurred in Rio Grande do Sul State, Brazil, particularly in the frontier zone adjacent to Uruguay. Forty-eight cases have been officially reported, but it is believed that many cases are not reported. The disease is said to be of a mild type, only one death from poliomyelitis being reported to date.

CANADA

Provinces—Communicable diseases—Week ended September 4, 1943.—During the week ended September 4, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		1	1	57	24	3	12	4	26	128
Diphtheria		10	3	13	1	2		3		32
Dysentery (amebic)						1				1
Dysentery (bacillary)				11			1			12
Encephalitis (infectious)							4			4
German measles				1	6		2	5	2	16
Influenza					19	1	1		4	25
Measles		2	1	11	53	34	6	38	21	166
Meningitis, meningococcus					1				1	2
Mumps	1			5	45	19	2	16	12	100
Poliomyelitis			5	9	3	3	3		2	25
Scarlet fever	1	5	3	34	35	13	14	21	9	135
Tuberculosis	1	9	7	137	52	24			19	249
Typhoid and paratyphoid fever			2	23	1		1	1		28
Undulant fever				8						8
Whooping cough		6		126	163	10	77	34	21	437

SWEDEN

Notifiable diseases—July 1943.—During the month of July 1943, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Poliomyelitis	58
Diphtheria	196	Scarlet fever	2,150
Dysentery	202	Syphilis	80
Gonorrhea	1,967	Typhoid fever	9
Hepatitis, epidemic	260	Undulant fever	3
Paratyphoid fever	31	Weil's disease	8

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Cochinchina.—For the period August 11–20, 1943, one fatal case of plague was reported in Cochinchina, Indochina.

Smallpox

Algeria.—For the period August 11–20, 1943, 17 cases of smallpox were reported in Algeria.

Guinea (French).—For the period August 11–20, 1943, 11 cases of smallpox were reported in French Guinea.

Indochina.—For the period August 11–20, 1943, 53 cases of smallpox were reported in Indochina.

Sudan (French).—For the period August 11–20, 1943, 89 cases of smallpox, with 32 deaths, were reported in French Sudan.

Typhus Fever

Algeria.—For the period August 11–20, 1943, 57 cases of typhus fever were reported in Algeria.

Germany.—For the period January 1 to April 30, 1943, 973 cases of typhus fever were reported in Germany.

Rumania.—For the period September 8–15, 1943, 23 cases of typhus fever were reported in Rumania.

Slovakia.—During the week ended September 4, 1943, nine cases of typhus fever were reported in Slovakia.

Spain.—During the week ended July 31, 1943, three cases of typhus fever were reported in Spain.

COURT DECISION ON PUBLIC HEALTH

City ordinance regarding maintenance of clean and habitable premises upheld.—(Maryland Court of Appeals; *Petrushansky* v. *State*, 32 A.2d 696; decided June 24, 1943.) A health ordinance of the city of Baltimore (No. 384, approved March 6, 1941) added to the city code eight new sections relating to the cleanliness and fitness for human habitation of dwellings. Briefly stated, the ordinance provided that every dwelling should be kept clean and free from any accumulation of dirt, filth, rubbish, garbage or similar matter, and vermin or rodent infestation; that no person should wilfully or maliciously deposit any material in any plumbing fixture which might result in the obstruction of a sanitary sewer; that every dwelling should be maintained in good repair and fit for human habitation; that the commissioner of health could order conditions found by him to be dangerous or detrimental to life or health to be remedied; and that the commissioner of health could order the vacation of dwellings found by him to be unfit for human habitation or dangerous to life or health. There were also other provisions having reference to the sending and posting of notices and orders by the health commissioner and the correction of unhealthful conditions by him through his own agents.

The appellant was charged with violating the ordinance by failing to abate a nuisance on certain premises owned and possessed by him after notice from the city health commissioner. On appeal to the Maryland Court of Appeals from his conviction in the lower court the appellant claimed that the ordinance was invalid on a number of grounds. His objections, which were rejected by the appellate court, were as follows: The ordinance was too vague and indefinite to be a valid criminal enactment; the ordinance was unreasonable and oppressive and beyond the charter powers of the city because it imposed liability upon owners out of possession and unreasonable burdens upon fiduciaries or agents; the ordinance unlawfully delegated to the health commissioner an arbitrary discretion whether or not to enforce it; no definite standards were defined in the ordinance for the health commissioner's guidance as to the conditions under which he was to act; the ordinance granted the health commissioner arbitrary discretion as to the corrective action to be taken; no adequate notice was provided by the ordinance; no review of an order of the health commissioner was permitted to test its validity or propriety; and the title of the ordinance was misleading.

The judgment appealed from was affirmed.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

Vol. 58 • OCTOBER 15, 1943 • *No. 42*

THE AUTOMATIC CONTROL OF EXPOSURE IN PHOTOFLUOROGRAPHY [1]

By RUSSELL H. MORGAN, *Division of Roentgenology, University of Chicago*

I. INTRODUCTION

The photofluorographic examination of the chest constitutes one of the most important methods for the early recognition of pulmonary tuberculosis in large population groups. It has been of inestimable value to the armed services in the selection of inductees and promises to be equally useful in the examination of civilian groups.

The photofluorographic process, to be entirely satisfactory, requires the fulfillment of certain criteria not usually encountered in general radiography. For example, the procedure must be conducted rapidly in order to permit the examination of large numbers of subjects in a reasonable interval of time, and, in addition, it must be extremely simple in order to reduce to a minimum the operating personnel. The number of repeat examinations due to technical failure of any kind obviously must be small, and, finally, the standard of uniformity between films must be maintained at an extremely high level if the films are to yield a maximum of diagnostic information. It will be evident that the accuracy of a radiologist may be considerably impaired by the periodic appearance of technically poor films.

In the past, a satisfactory fulfillment of these criteria has been difficult, if not impossible, to achieve. However, this situation is likely to be substantially corrected before long by the application to photofluorography of a recently developed instrument called the photoelectric timing mechanism or phototimer (*1*). This device completely automatizes the photofluorographic process, so that the technician is required merely to place the subject before the X-ray machine and to close the exposure switch; time-wasting adjustments of equipment are entirely eliminated. Furthermore, the photoelectric timing

[1] The work described in this paper was done under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the University of Chicago.

mechanism, by its inherent design, terminates X-ray exposure at the instant when a film has received the proper quantity of radiation to insure correct exposure. Excellent uniformity of radiographic quality thereby is assured, and repeat examinations due to technical failure are infrequent.

As described in previous communications, the photoelectric timing mechanism, or phototimer, consists primarily of a multiplier phototube and a condenser-thyratron-relay system. A schematic diagram of the fundamental circuit arrangement is shown in figure 1. When the exposure switch, *Sw,* of the X-ray machine is closed, the X-ray

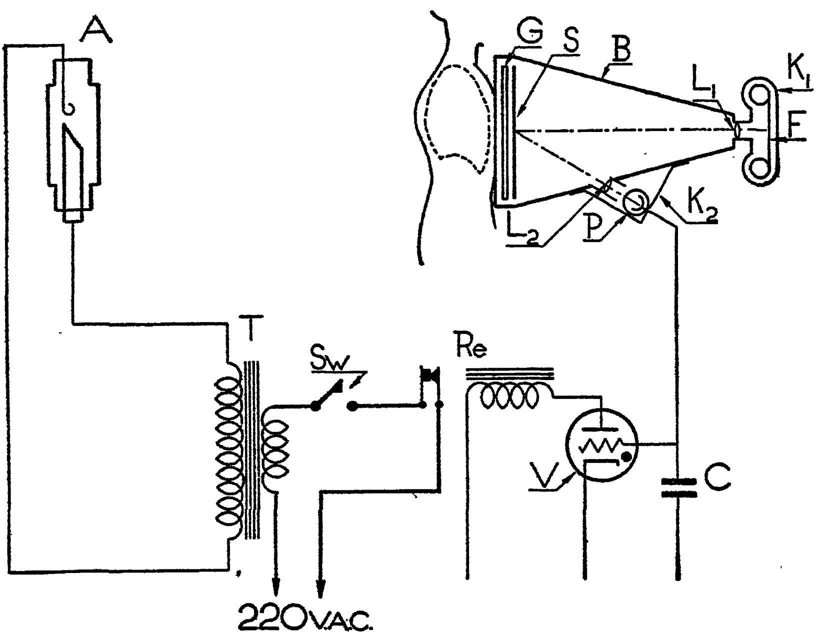

FIGURE 1. Fundamental circuit of the photoelectric timing mechanism applied to a photofluorograph. *A,* X-ray tube; *B,* pyramid of photofluorograph; *G,* grid; *S,* fluorescent screen; L_1, lens of photographic camera, K_1; *F,* photofluorographic film; L_2, lens of phototube camera, K_2; *P,* phototube; *C,* condenser; *T,* thyratron; *Re,* relay; *Sw,* exposure switch of X-ray machine; *T,* X-ray transformer.

tube, *A,* is energized through the transformer, *T,* and emits an X-ray beam which passes through the subject standing in front of the pyramid, *B,* of the photofluorograph. The radiation is filtered of undesirable scattered components by the grid, *G,* and then impinges on the fluorescent screen, *S.* Some of the resulting light from the fluorescent screen is focused by the lens, L_1, on the film, *F,* in the photographic camera, K_1; simultaneously, another part is focused by the lens, L_2, on the phototube, *P,* in the phototube camera, K_2. In response to this latter radiation the phototube conducts a small electric current whose magnitude is proportional to the radiation intensity. This current is collected by the condenser, *C,* and produces

across its plates a potential which becomes progressively greater as the amount of collected charge increases. When this potential reaches a certain level the thyratron, *T*, ionizes and activates the relay, *Re*. This causes the relay's contacts to open and to break the X-ray circuit, thereby terminating the photofluorographic exposure. By properly adjusting the sensitivity of the phototube, *P*, the size of the condenser, *C*, and the potential at which the thyratron, *T*, ionizes, the phototimer can be made to terminate the X-ray exposure at exactly the instant at which optimum diagnostic quality of the film occurs.

II. THEORETICAL DISCUSSION OF THE PHOTOELECTRIC TIMING MECHANISM

It has been previously shown (*2*) that a roentgenographic film exhibits optimum diagnostic quality when the average density of the significant portions of the film has a value of 0.9. It has also been shown that the conditions under which this criterion is fulfilled are given by the equation

$$\overline{G}ts_e=1 \qquad (1)$$

where $\overline{G}$ is the average effective intensity of the radiation exposing the film,

t is the exposure time, and

s_e is the speed of the film.

It will be observed that equation (1) indicates that when the intensity of the exposing radiation is low a relatively long exposure time is required; when the intensity of the radiation is high, the exposure time must be short. Also, relatively long exposure times are required when films of slow speed are employed, whereas short exposure times are sufficient when fast films are used. This is mentioned only to illustrate that equation (1) specifies in quantitative terms what has been well known qualitatively to radiologists for many years.

The current conducted by a phototube in response to the radiation falling on its sensitive surface is proportional to the intensity of the exposing radiation. By focusing a representative portion of the fluorescent image (see fig. 3) on the sensitive surface of the phototimer's phototube, the current response of the tube will be proportional to the average intensity of the radiation emitted by the fluorescent screen, and, therefore, proportional to the average effective intensity of the radiation falling on the photofluorographic film; that is,

$$i=k\overline{G} \qquad (2)$$

where i is the phototube current, and

k is a proportionality constant whose value is a function of phototube sensitivity.

Since the spectral distribution or quality of the fluorescent radiation emitted by the screen does not change appreciably with the quality of the activating X-radiation, equation (2) is valid regardless of the thickness of the patient, the presence or absence of a stationary focused grid, and the kilovoltage and milliamperage of the X-ray machine.

The charge, Q, on the condenser, C, at the instant at which the photofluorographic exposure is terminated is given by the equation

$$Q=CV \quad (3)$$

where C is the capacity of the condenser, and

V is the potential of the condenser produced by the collected phototube current.

The charge, Q, is also equal to the product of the phototube current, i, by the exposure time, t; that is,

$$Q=it \quad (4)$$

When Q is eliminated from equations (3) and (4),

$$it=CV \quad (5)$$

and when i is eliminated from equations (2) and (5)

$$\frac{Gtk}{CV}=1 \quad (6)$$

It is evident from equation (6) that equation (1) will be satisfied, and, accordingly, the photofluorographic film correctly exposed, when

$$s_e=\frac{k}{CV} \quad (7)$$

That is, by properly adjusting the sensitivity of the phototube, the capacity of the condenser, C, and the potential, V, at which the thyratron ionizes to correspond with the speed of the photofluorographic film being used, the phototimer will terminate X-ray exposure at the instant when sufficient radiation has been delivered to the film to insure optimum diagnostic quality.

III. DESIGN OF THE PHOTOELECTRIC TIMING MECHANISM

As developed for photofluorography, the photoelectric timing mechanism comprises three units: a phototube camera, a chassis-unit including the condenser-thyratron circuit, and a contactor or relay. A diagram of the phototube camera is shown in figure 2. The unit consists of a semirectangular box including the lens, L_2, and the phototube, P. The lens is a simple biconvex type having a focal length of 5 cm. and a diameter of 1.5 inches. The phototube is the R. C. A. 931 multiplier type. The lens and phototube are arranged in the camera in such a position that the portion of the roentgenographic image of the chest shown in dotted outline in figure 3 is projected on the sensitive surface of the tube. It was decided to scan this portion of the fluorescent screen because the upper lung ields are particularly significant from the standpoint of tuberculous

pathology. Also, this portion of the lung fields excludes most of the heart shadow; therefore, variation in the size of the heart among different individuals will not cause variation in the operative characteristics of the phototimer. Furthermore, when this portion of the

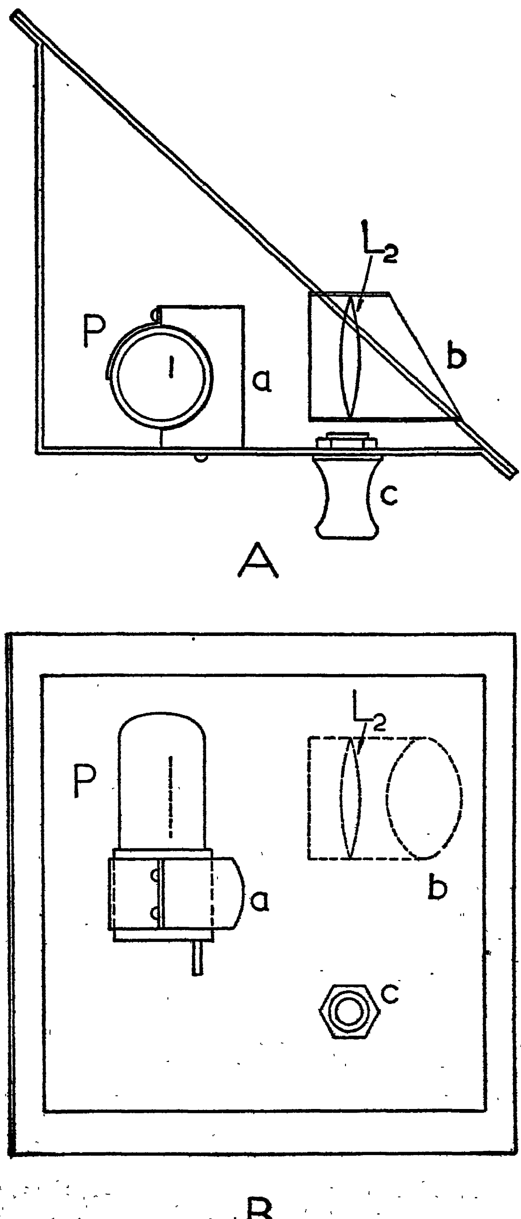

FIGURE 2. Phototube camera. *A*, side elevation; *B*, floor plan; *P*, phototube; *a*, phototube mounting, *L₂* lens; *b*, lens mounting; *c*, cable receptacle.

screen is scanned, the adjacent axillae and arms make it unlikely that radiation from an uncovered portion of the screen will be focused on the phototube, should the patient be improperly centered from side to side, and, finally, quantitative measurements reveal that the intensity of the light falling on the phototube is not appreciably affected by positioning the subject a few centimeters above or below the optimum level.

A schematic diagram of the entire phototimer circuit is shown in figure 4. Potentials for the various electrodes of the multiplier phototube, P, are supplied by the step-up transformer, T_1, the rectifier tube, V_2, the condenser, C_3, the resistor network, R_1, and the variable resistor, R_4. These potentials are stabilized against fluctuations in line voltage by the gas triode, V_1, and the resistors, R_2 and R_3. The sensitivity of the phototube is controlled by the resistor, R_4. This device may be conveniently called the film speed control since its correct position depends on the speed or sensitivity of the film being used in the photofluorograph.

As in previous phototimer circuits, the ninth dynode of the phototube, P, constitutes the control electrode of the circuit. The photocurrent from this electrode is directed to a condenser-thyratron system, comprising the condensers, C_1 and C_2, and the thyratron, V_4, a cold-cathode type. The plate of the thyratron, V_4, is coupled through the resistors, R_5 and R_6, to the grids of two heavy-duty thyratrons, V_8 and V_9, whose plates in turn are in series with the two field coils of the relay, Re_1. The X-ray tube of the photofluorograph is energized by the main contacts of this relay, and accordingly these contacts must be capable of conducting 50 to 100 amperes.

Because the intensity of the radiation falling on the phototube, P, is extremely small, the photocurrent delivered to the condenser-thyratron circuit is also small (a few microamperes). To prevent loss of photocurrent through leakage, the thyratron, V_4, is of the low grid-current type. Such a tube, however, does not have the capacity to activate the field coils of the relay, Re_1, and accordingly the heavy-duty thyratrons, V_8 and V_9, are interposed in the circuit. The thyratron, V_4, could control the relay, Re_1, through a small intermediate relay rather than through these additional thyratrons, but a mechanical device of this sort introduces a considerable time lag in the operation of the phototimer, so that films of thin subjects might be as much as 50 percent overexposed. The thyratrons, V_8 and V_9, on the other hand, operate almost instantaneously; consequently the time lag of the phototimer does not exceed one-sixtieth of a second. Most of this lag is introduced by the relay, Re_1, due to its mechanical action. Such a lag, however, is of little significance since photofluorographic exposures are many times one-sixtieth of a second, and such an added exposure is of no importance. If, in the future, exposure times become

FIGURE 3.—Roentgenogram of the chest indicating in dotted outline the portion of the photofluorographic image that is projected on the light-sensitive surface of the phototube.

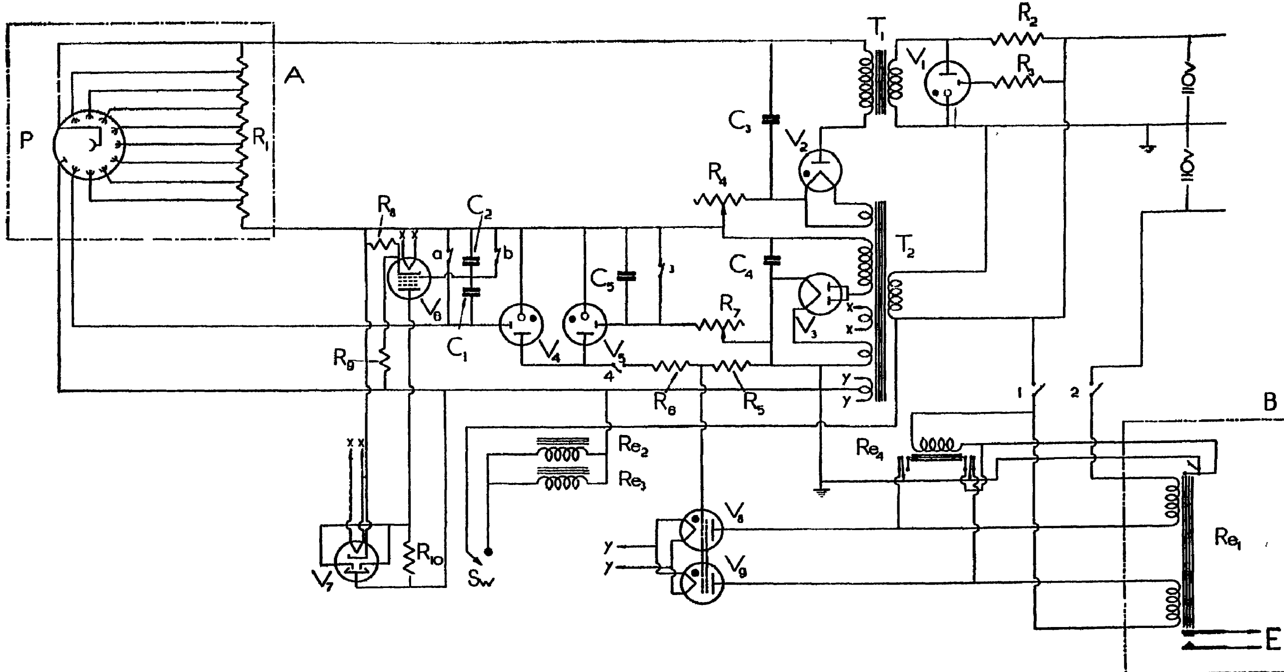

FIGURE 4.—Schematic diagram of complete phototimer circuit. A, phototube camera; B, contactor unit; E, leads which parallel main contactor of X-ray machine; P, 931 multiplier phototube; V_1, V_4 and V_5, OA4–G gas triodes; V_2, 2×2/879 rectifier; V_3, 5W4–GT rectifier; V_6, 6J7–GT radiotron; V_7, 6AF6–G electron indicator tube; V_8 and V_9, FG–98A thyratrons; R_1, nine 0.1 meg. resistors; R_2, 1000 ohm, 25 watt resistor; R_3, 50,000 ohm resistor; R_4, 0.5 megohm potentiometer; R_5, 10,000 ohm resistor; R_6, 20,000 ohm resistor; R_7, ten 1.0 meg. resistors; R_8, 5000 ohm resistor; R_9, 75,000 ohm resistor; R_{10}, 0.5 meg. resistor; C_1, 0.02 mfd. condenser; C_2 and C_5, 0.25 mfd. condensers; C_3, 1.0 mfd., 1500 volt condenser; C_4, 16 mfd., 250 volt condenser; T_1 and T_2, transformers; Re_1, Re_2, Re_3 and Re_4, relays.

appreciably less than at present, the lag can be considerably reduced by the replacement of the relay, Re_1, by electronic ignitron tubes.

It has been noted that the relay, Re_1, has two field coils. This deviation from standard design was necessitated by the fact that a thyratron, when operated on alternating current, conducts only during the positive phase of the cycle. If the relay were operated with a single thyratron through the customary single field coil, the coil would require a relatively large amount of energy for its activation; furthermore, the device would be noisy and would tend to introduce additional time lag. These difficulties are effectively overcome by the double field coil, energized by two thyratrons, and connected to its power supply in such a way that one coil will be energized during one half of the cycle and the other during the second half. The two coils collectively cause the relay to behave as a single-coil type operated in a conventional manner.

When the field coil of a relay is energized, the current consumed by the coil is relatively large until the contacts close. To spare the thyratrons, V_8 and V_9, of this overload, the relay, Re_4, is employed. This device short-circuits the thyratrons until the relay, Re_1, is closed and places these tubes in circuit only when the field current is at a minimum.

Parallel to the thyratron V_4 is another thyratron, V_5, in whose grid circuit is the resistor-condenser network comprising the variable resistor, R_7, and the condenser, C_5. This circuit constitutes a variable time-limiting device which terminates automatically the X-ray exposure at the maximum exposure limit of the X-ray tube, should the phototube circuit not have already done so. Occasionally, when extremely heavy patients are being filmed, an exposure time longer than the limit of the X-ray tube will be required to produce a film of optimum diagnostic quality. This safety circuit prevents X-ray tube damage in these cases.

Another safety device is the electron indicator tube, V_7. This tube provides a simple means for checking from time to time the performance of the phototimer. When the instrument is functioning satisfactorily, the angle subtended by the tube is 0° before the exposure is begun, and approximately 90° when it is completed. Variation from these readings indicates faulty operation. The indicator tube, V_7, is controlled by the phototube, P, through the condenser network, C_1 and C_2, and the amplifier tube, V_6.

The potentials for the thyratrons, V_4 and V_5, the tubes, V_6 and V_7, and the anode of the phototube, P, are obtained through a 110-volt winding of the transformer, T_2, the rectifier tube, V_3, and the condenser, C_4. The transformer, T_2, also supplies the various filament potentials of the circuit.

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The phototimer is controlled by the relay, Re_2, having the normally closed contacts, a and b, and the relay, Re_3, having the normally open contacts, 1, 2, and 4, and the normally closed contact, 3. When the exposure switch, Sw, is closed the relays, Re_2 and Re_3, are activated, causing contacts, 1, 2, and 4 to close, and contacts a, b, and 3 to open. At this instant the potentials of the thyratrons, V_4 and V_5, are such that these tubes are nonconducting and consequently the grids of the thyratrons, V_8 and V_9, are essentially at zero potential relative to their filaments. These latter tubes, therefore, ionize and cause the field coil of the relay, Re_1, to be energized. The contacts of the relay thereby are closed, the X-ray tube energized, and the X-ray exposure begun. The current developed by the phototube, P, in response to the radiation impinging on its sensitive surface, progressively charges the condensers, C_1 and C_2, during the exposure. When the sum of the potentials of these condensers reaches a predetermined level, the thyratron, V_4, ionizes, and a negative potential is developed across the resistors, R_5 and R_6. The thyratrons, V_8 and V_9, consequently become nonconductive, the relay, Re_1, is de-energized, and the X-ray exposure terminated. Should the exposure required for optimum diagnostic quality be longer than that which the X-ray tube will tolerate, the thyratron tube V_5 will ionize at the maximum time limit of the tube and terminate the exposure in a similar manner to that described for the thyratron V_4.

When the exposure switch, Sw, is opened, relays, Re_2 and Re_3, are de-energized, contacts 1, 2, and 4 are opened, and contacts a, b, and 3 are closed. This discharges the condensers, C_1, C_2, and C_5, and de-energizes the thyratrons, V_4 or V_5. The phototimer thereby is automatically set up for the next exposure.

IV. INSTALLATION AND OPERATION

The installation of the photoelectric timing mechanism involves three procedures: 1, the mounting of the phototube camera; 2, the wiring of the instrument to the X-ray machine; and 3, the adjustment of the controls, R_4 and R_7.

The phototube camera is mounted on the lower surface of the photofluorographic pyramid in such a position that its lens is 15 inches from the fluorescent screen. An opening in the pyramid approximately 3 inches in diameter permits light from the screen to enter the lens. The camera is focused by moving the lens within its tubular mounting. This procedure may be facilitated by substituting in the camera a dummy phototube for the real tube, the former having a lumarith window at the position of tube's sensitive surface. A 14 x 17 roentgenogram, backed by an illuminator and placed at the level of the fluorescent screen, will serve as a convenient test object.

The wiring of the phototimer to the X-ray machine presents no special problem.

The correct position of the resistor, R_7, is that at which the maximum exposure time which may be obtained corresponds to the time limit tolerated by the X-ray tube. To adjust the film speed control, R_4, it is necessary to make a series of chest films taken with the control in several different positions. When the films are developed, the film of optimum quality is chosen and the control rotated to that position at which this optimal film was exposed. Once this procedure is completed, further adjustments are necessary only when a new brand of film is employed.

The operation of a phototimer-equipped photofluorograph is extremely simple. The X-ray machine is turned on and suitable kilovolt and milliampere settings chosen (90 kv. (peak) and 200 ma. are satisfactory). To make an exposure one merely closes the exposure switch; the phototimer controls the remainder of the operation automatically. The measurement of chest thickness, the calculation of exposure factors, and the adjustment of X-ray kilovoltage, milliamperage, and exposure time are entirely eliminated. The phototimer, by providing automatic control of exposure time, supplants the customary mechanical timer in the X-ray circuit.

V. FIELD EXPERIENCE

A short time ago a phototimer similar to that described in the preceding paragraphs was installed on a photofluorograph belonging to the United States Public Health Service. The unit has been operating in the Washington area and at the time of this writing has performed approximately 15,000 examinations. It has been found that automatic timing reduces by 50 percent the personnel required to operate a photofluorograph. Furthermore, the physicians reading the photofluorographic films report a marked uniformity in film quality. This uniformity, they state, not only improves their diagnostic skill but also reduces considerably the fatigue experienced when large numbers of films are examined.

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THE SUCCESSFUL TREATMENT OF GRANULOCYTOPENIA AND LEUKOPENIA IN RATS WITH CRYSTALLINE FOLIC ACID [1]

By Floyd S. Daft, *Principal Biochemist*, and W. H. Sebrell, *Senior Surgeon, United States Public Health Service*

The production of granulocytopenia, leukopenia, and anemia in rats fed sulfonamides in purified diets and the prevention and successful treatment of these dyscrasias by liver and liver extracts have been reported previously from this laboratory (*1*, *2*). These findings have been confirmed by other workers (*3*, *4*). The successful treatment of sulfonamide leukopenia in rats with xanthopterin has been asserted (*5*) and denied (*4*, *6*).

Very early in our work with the blood dyscrasias it became apparent that the constituent of liver concentrates, active for the rat, remained closely associated with a growth factor for *Lactobacillus casei* (*7*) and *Streptococcus lactis* (*8*) through many concentration and purification procedures. The name "folic acid" has been suggested for this factor (*8*). Within the past few months its isolation in crystalline form (*9*, *10*) has been announced, and evidence has been presented (*9*) for its identity with vitamin B_c, an antianemia factor for the chick. It has also been announced (*10*) that the folic acid isolated from liver differs from the folic acid isolated from yeast.

The proof of the identity or nonidentity of folic acid and the factor active in the correction of blood dyscrasias in the rat awaited the availability for testing purposes of the pure material. We are able to announce at this time that three solutions of crystalline folic acid furnished to us from two different sources [2] have proved active in our tests. This is interpreted as evidence for the identity of folic acid and the factor responsible for the correction of the blood dyscrasia in the rat.

EXPERIMENTAL

Albino rats at weaning or shortly thereafter were placed on a purified diet containing sulfaguanidine or sulfasuxidine and were given a daily vitamin supplement. The diet used (with the exceptions noted in table 1) consists of sulfaguanidine, 1 percent; "Smaco" vitamin-free casein, 18 percent; cod-liver oil, 2 percent; cottonseed oil, 3 percent; salt mixture No. 550 (*1*), 4 percent; and glucose ("Cerelose"), 72 percent. The daily vitamin supplement consists of 100 micrograms of thiamin hydrochloride, 100 of pyridoxine hydrochloride, 200 of riboflavin, 200 of calcium pantothenate, 1 mg. of nicotinic acid, and 10 mg. of choline chloride. Crystalline biotin at a level of 0.5 or 2 micro-

[1] From the Division of Chemotherapy, National Institute of Health.

[2] Furnished through the courtesy of Dr. A. D. Emmett, of Parke Davis & Co., and of Drs. E. L. R. Stokstad, B. L. Hutchings, and N. Bohonos, of Lederle Laboratories, Inc.

grams per rat per day was given during the latter part of the experiment.

After a variable length of time (30–122 days) on experiment, rats which showed a total leukocyte count not greater than about 4,000 cells per cubic millimeter, of which not more than about 200 were granulocytes, were selected for use in testing the activity of the folic acid solutions and of xanthopterin against granulocytopenia and leukopenia. The selected animals were given orally the amounts of the test solution indicated in table 1 daily for 4 consecutive days. At the end of the 4-day test period, recounts of the leukocytes and granulocytes were made. The techniques involved were described in an earlier communication (*1*).

Hematocrit determinations also were made. When values of about 30 volumes percent or below were found, hemoglobin determinations and erythrocyte counts were obtained. Nine of the anemic animals were used for testing solutions of crystalline folic acid for antianemia activity. The solutions were administered daily for 4 days as above. Hematocrits, red-cell counts, and hemoglobin determinations were repeated at the end of 10 days, since incomplete responses were found after shorter periods (*2*). Four of these nine animals showed granulocytopenia and leukopenia as well as anemia.

TABLE 1

Test substance	Dosage	Before treatment		After treatment		Weight gain in grams
		Total white blood cells per cubic millimeter	Percentage of polymorphonuclear granulocytes	Total white blood cells per cubic millimeter	Percentage of polymorphonuclear granulocytes	
Xanthopterin [1] [2]	40 micrograms	1,350	2	1,000	0	−1
		1,950	1	1,200	2	−1
	20 micrograms	4,200	5	4,700	1	−6
		2,500	0	1,650	3	0
		3,100	0	1,600	0	−3
		3,500	4	4,600	1	−18
Solution 38453 [3]	0.2 cc.	1,600	0	17,200	52	23
		2,750	2	13,800	31	25
		3,750	2	12,200	30	16
	0.05 cc.	1,150	2	5,150	56	15
		2,800	2	8,600	48	18
Solution F-6-9-5-7 [4]	0.1 cc.	2,100	2	10,450	28	−1
		4,200	0	5,200	18	15
		1,600	0	2,500	19	19
		4,000	0	11,050	37	16
		4,150	5	21,400	51	16
Solution WF-6-9 [4] [5]	0.5 cc.	1,600	3	10,700	55	10
		3,200	0	4,250	33	9
		2,900	0	12,300	30	3
	0.25 cc.	2,450	10	6,100	37	6
		2,600	5	9,000	42	13

[1] 2 samples were tested. They were furnished through the courtesy of Dr. E. L. R. Stokstad of Lederle Laboratories and Dr. Oliver Kamm of Parke Davis & Co.

[2] 4 of these animals received 1 percent of sulfasuxidine in place of sulfaguanidine in the basal diet.

[3] 100 micrograms of vitamin B_6 per ml. Furnished through the courtesy of Dr. A. D. Emmett of Parke Davis & Co.

[4] F-6-9-5-7, 200 micrograms of folic acid per ml. WF-6-9, 42.8 micrograms of folic acid per ml. Furnished through the courtesy of Drs. E. L. R. Stokstad, B. L. Hutchings, and N. Bohonos of Lederle Laboratories. The source of this folic acid was not given but it was stated not to be identical with either of the folic acids previously described (*10*).

[5] The basal diets for these rats differed in respect to the drug. One received 0.5 percent of sulfaguanidine, two 0.5 percent of sulfasuxidine, and two 1 percent of sulfasuxidine in the purified diet described in the text.

RESULTS AND DISCUSSION

The results of our tests of xanthopterin and of crystalline folic acid solutions for activity against granulocytopenia and leukopenia are given in table 1. These data indicate that under our experimental conditions xanthopterin in doses of 20 or 40 micrograms per day for 4 days does not correct these blood dyscrasias. The average total leukocyte count at the beginning of the test was 2,750 per cu. mm., with 2 percent granulocytes. After 4 days of treatment with xanthopterin, the average total leukocyte count was 2,450 per cu. mm., with 1 percent granulocytes.

All three solutions of crystalline folic acid in the amounts tested showed definite activity by an increase both in total leukocytes and in percentage of granulocytes. For example, the administration of solution 38453 in a daily dose of 0.2 cc. (calculated as containing 20 micrograms) for 4 days was accompanied by an average increase in total leukocytes from 2,700 per cu. mm. to 14,400 per cu. mm. and an average increase in the percentage of granulocytes from 1 to 39 percent.

The effect of solutions of crystalline folic acid[3] on anemia was tested in nine rats. Seven of these animals recovered during the 10-day test period. The average hematocrit increased from 29.8 to 42.1 volumes percent, the average erythrocyte count from 5.1 to 6.9 millions per cu. mm., and the average hemoglobin from 9.7 to 12.8 gm. percent. In the other two animals the values declined. On the basis of these data, it seems probable that crystalline folic acid also has antianemia activity.

CONCLUSIONS

Three solutions of crystalline folic acid furnished to us from two different sources have shown activity in correcting leukopenia and granulocytopenia in rats induced by feeding sulfaguanidine and sulfasuxidine in purified diets.

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THE WAR AND THE DISTRIBUTION OF PHYSICIANS [1]

By G. St. J. Perrott, *Chief, Division of Public Health Methods*, and Burnet M. Davis, *Passed Assistant Surgeon (R), United States Public Health Service*

What effect is the war having on the number and distribution of civilian physicians? In time of peace, medical care may be regarded as a necessity largely for humanitarian reasons; in total war it concerns us primarily because of the importance of maintaining maximum production with limited manpower. It is estimated that industry loses the equivalent of 1,000,000 employees' work every day because of illness and injury; how much food production is lost through illness among agricultural workers is not known.

It must be admitted at the outset that there is no simple relationship between the number of physicians in a community and the prevalence of disability-producing disease in that community. It has been shown that the number of physicians' services per capita varies greatly in different States, and that even when there are relatively few physicians in a community some of them may not be working to capacity (*1*). We have no quantitative measure of the effect of physicians' services on disabling morbidity. It is generally accepted, however, that if the availability of physicians' services falls below a critical level, health, morale, and productivity suffer. It is not the purpose of this paper to define what level may be considered critical, or, indeed, how this level can be measured. The only readily applied index of such a level is the ratio of physicians to persons, or the more commonly used reciprocal, the number of persons per physician in the area under consideration. It is to be emphasized that this index is a crude one, since a high ratio of physicians to population does not guarantee a high level of services to all segments of the population. On the other hand, the total amount of service available is necessarily limited by the number of persons qualified to provide that service. The ratio

[1] From the Division of Public Health Methods, National Institute of Health.

may, therefore, be used as an index of the maximum amount of medical service potentially available to a community.

It is well known that the distribution of physicians, in terms of persons per physician, has shown great variation among the several States for many years. It is also known that this variation has a high positive correlation with State variation in per capita income and degree of urbanization, and with the ratios of dentists, nurses, and hospital beds to population.

The number of physicians in the United States, or in any of its subdivisions, is dependent on a dynamic rather than a static equilibrium. Physicians are continually being removed from practice by death and retirement and are being replaced by new additions to the profession coming out of the medical schools. It has been shown that the changes occurring in the number of physicians in the several States over a period of years have been due chiefly to the relationship existing between deaths and acquisition of new graduates by each State; the net effect of interstate migration has been very small. The trend during the past 20 years has been for the States rich in physicians to become richer and the poor, poorer, largely because of the preference of new graduates for location in the medically wealthy States (*2*).

The obvious effect of the war on our medical manpower has been the withdrawal of about one-third of our active practitioners. Other less obvious factors are also disturbing the equilibrium and are thus affecting the number and distribution of physicians. If the war should end within a year and if demobilization and resumption of peacetime medical education should be effected immediately, these factors would be of but slight importance, for their effect is cumulative. How long the war will last we do not venture to predict, but it appears evident from the present medical training program that the Army and Navy expect to require large numbers of medical officers for a considerable number of years.

What changes have already taken place in the medical manpower picture, and what further changes may we expect to take place at the National and State levels during the next few years? To help answer these questions it is possible to make estimates by applying vital statistics, announced policies of recruitment and of medical education, and knowledge of well-established trends to available pre-war data on the number and distribution of physicians. Such estimates have been prepared and are herewith presented, carried ahead to January 1, 1950. They are, of course, subject to errors inherent in all predictions. Nevertheless, it is believed that these estimates are sufficiently accurate to demonstrate certain significant trends.

THE NATIONAL PICTURE

A summary of the national picture is shown graphically in figure 1. The curves are based on calculations as of January 1, 1942, and as of dates at subsequent 2-year intervals, by a method based on data and assumptions described in the appendix. It is evident from figure 1 that the decrease in the number of physicians is extremely rapid during the present 2-year interval, falling to 85,000 by the end of this year. Nearly nine-tenths of this decrease is due to recruitment by the armed services. The rate of recruitment has,

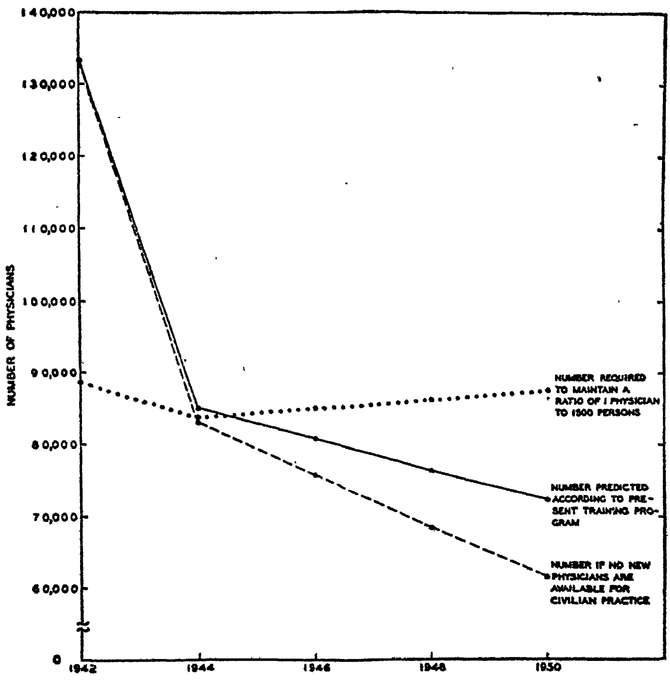

FIGURE 1.—Active private practitioners, United States, 1942–50.

of course, not been constant; the straight line merely represents the average rate for the 2-year interval. After the end of 1943, it is anticipated that recruitment of practicing physicians will virtually cease and that the armed services will obtain the additional medical officers needed from among the new physicians completing their education.

Since the services expect to take 80 percent of all medical graduates, the number entering civilian practice will no longer fully replace those who die or retire, so that a net annual loss of about 2,100 is shown by the curve after January 1, 1944. This will leave approximately 72,000 physicians in practice by January 1, 1950.

Two hypothetical curves are also shown on figure 1 for comparison with the predicted curve. The dotted line shows the number of physicians required to provide a national average ratio of 1,500 persons per physician, a level which appears to have been generally accepted as the wartime minimum for civilian safety (*3*). This curve falls during the current period because building up the Army and Navy is reducing our civilian population, but after the end of this year, when inductions diminish in number, the civilian population will begin to increase again. It is seen that the solid and dotted curves cross early in 1944; that is, the national ratio then becomes 1,500 persons per physician and thereafter grows progressively worse. The second hypothetical curve, the broken line, shows the course of events if no new graduates were to enter civilian practice. Comparison of this curve with the solid line gives an idea of the contribution toward maintaining the 1 to 1,500 ratio which will be made by the 20 percent of the new graduates who will become civilian practitioners.

Thus, it is evident that the present military procurement objectives for medical officers, accompanied by a continuation of the previously existing and inevitable death rate, is causing a notable attrition in medical manpower which will become progressively more serious until by 1950 the country will be more than 15,000 physicians short of the number required to maintain the 1,500 persons-per-physician ratio. The crude index of the ratio actually underestimates the diminution in civilian medical services, since there is much evidence that the older physicians remaining in practice do not and cannot carry as heavy a work load as do the physicians under 45 years of age (*1*).

THE STATE PICTURE

As with the pre-war situation, the national average figures for recruitment and attrition of the medical profession conceal wide variations among the States. Any consideration of the effect of the war on the supply of physicians must give attention to data on the State and local situations. Local data must await further local studies, but at the State level sufficient data are available so that estimates may be made which are comparable to those for the country as a whole.

Figure 2 shows the change in the ratios of persons per physician in six selected States,[2] with the United States average included for comparison. To enable comparison of the rates of increase in the number of persons per physician the ratios have been charted on a logarithmic scale; the slope of each curve, therefore, represents the percentage change in the ratio during each 2-year interval. Two

[2] See appendix for method of selection.

trends are brought out by this chart. First, the initial drop, due to recruitment, is steeper in the upper curves, and second, the subsequent slower fall, due to unreplaced losses from the profession, is steeper in the lower curves. The explanation of these observations is not difficult.

Recruitment has to some extent been controlled by the quotas set for each State by the Procurement and Assignment Service in June 1942. These quotas were based on the premise that physicians could

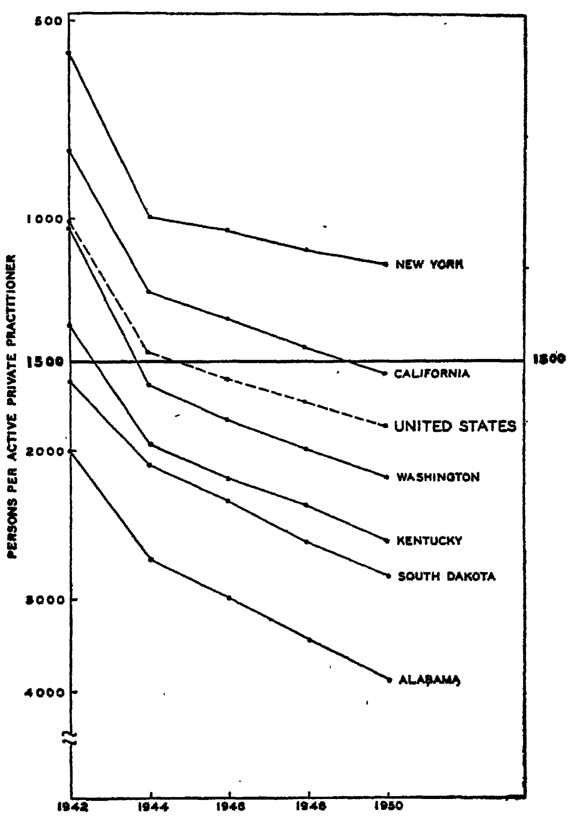

FIGURE 2.—Ratio of population to active private practitioners, United States and selected States, 1942–50.

be spared from each State in inverse proportion to the number of persons per physician existing in that State. For a number of reasons these quotas had not been exactly met up to the date of the last figures available, but their existence unquestionably slowed up recruitment in the States which were relatively poor in number of physicians.

The more rapid attrition after 1944 seen in the poorer States is accounted for by two factors. First, the bulk of young physicians entering practice has in the past gone to the wealthier States and it is assumed that the small number not going into service will continue to

follow approximately the distribution which occurred in the last 2 years before Pearl Harbor. Figure 3 brings out the unevenness of settlement of new physicians: For example, New York, with about 10 percent of the country's population, gets nearly 18 percent of the new physicians, while Alabama, with over 2 percent of the population, gets only one-third of a percent of the physicians. The second reason arises from the fact that the first factor has been operating for so many years that those States which now are receiving the fewest new

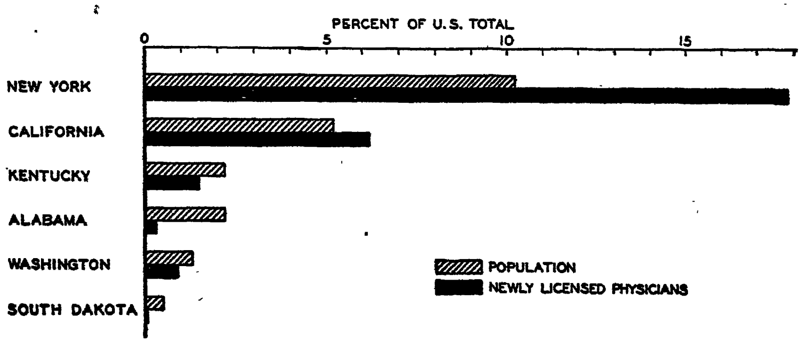

FIGURE 3.—Percent of United States total population and of newly licensed physicians in selected States, 1940 and 1941.

physicians also tend to have the highest proportion of old physicians, as is shown graphically in figure 4. The death rate among the medical profession is, therefore, highest in these same States.

It is often said that war accelerates previously existing socio-economic trends. This would appear to be particularly true of the distribution of physicians, except where, as in the case of the State recruitment quotas, artificial controls have been established to combat existing trends. By reducing the supply of young physicians to

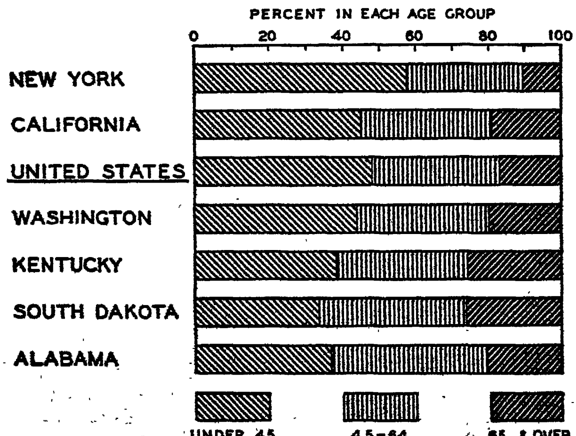

FIGURE 4.—Age distribution of physicians in the United States and selected States, 1942.

about 30 percent of its former size,[3] while leaving the death rate unchanged, the war has greatly increased the rate at which the medically poor States are becoming poorer.

Returning to figure 2, it will be noted that four of the six States start above the 1 to 1500 line and all but one fall below it by 1950. It is evident that the two most favored States will still be better off in 1950 than the two poorest States were in 1942.

Of more immediate concern is the situation which will exist by January 1, 1944. Figure 2 shows the rapid changes in the ratios for the six selected States. What the recruitment during the 2 years 1942 and 1943 means in terms of all the States is shown in figure 5.

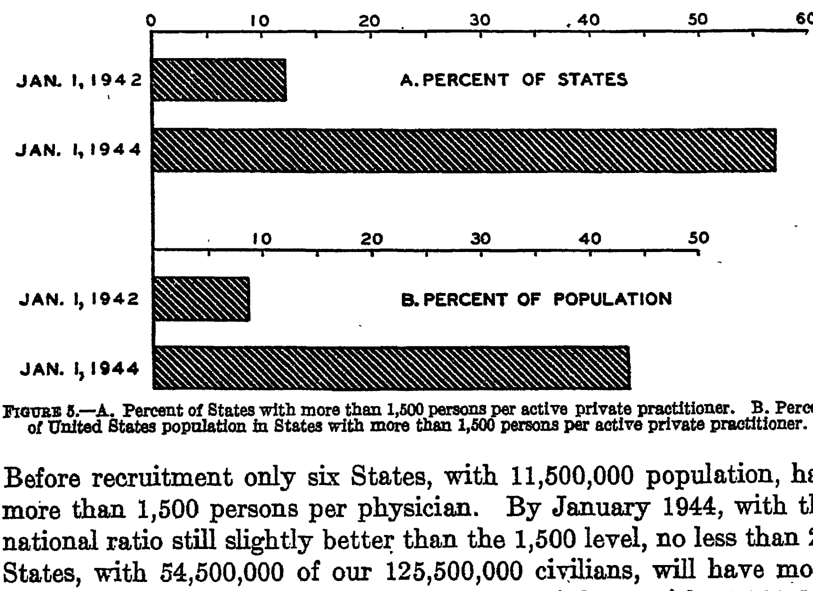

FIGURE 5.—A. Percent of States with more than 1,500 persons per active private practitioner. B. Percent of United States population in States with more than 1,500 persons per active private practitioner.

Before recruitment only six States, with 11,500,000 population, had more than 1,500 persons per physician. By January 1944, with the national ratio still slightly better than the 1,500 level, no less than 28 States, with 54,500,000 of our 125,500,000 civilians, will have more than 1,500 persons per physician. In seven of these, with 13,500,000 population, the ratio will be more than 2,000 persons per physician.

It seems probable that the statistical predictions made for State ratios underestimate the trend toward concentration of physicians in the richer States. There is reason to believe that the high consumer demand for medical services in these States will attract physicians from the poorer States to fill vacancies left by those going into military service. Since no quantitative data on this point are available, no correction has been made for this factor. Whatever uncontrolled migration of physicians occurs, however, may be expected to be in a direction which will exaggerate the tendency demonstrated.

The computed State ratios also underestimate the potential seriousness of the medical care situation for another reason which must be

[3] While the armed forces expect to take 80 percent of new graduates, the wartime increase in medical school output brings the number available for civilians up to about 30 percent of the pre-war level.

kept in mind. Just as the national ratio conceals variations among the several States, so do the State ratios conceal as wide, or even wider variations at local community levels, where medical service is actually obtained by the patient (*4*, *5*). It seems probable that the same factors which are tending to concentrate physicians in the wealthier States will also tend to cause a shift of practitioners to the urban and wealthy areas within individual States. Data are not available, however, on which to base predictions at local levels.

DISCUSSION

The purpose of presenting these estimates is to draw attention to two points which have received relatively little consideration in discussions of medical manpower: First, the very considerable annual decrease in the number of civilian physicians which will persist even after recruitment has ceased, and second, the wide and ever widening variation in State levels which is concealed by the national average ratio of population to physicians.

If the much quoted ratio of one physician per 1,500 civilians is accepted as a minimum national average, the trend demonstrated for the national level constitutes a threat to adequate medical service and, therefore, to maximum war production. An even greater threat is presented by the trend shown for State levels and implied for localities. If the output of our medical schools cannot be further increased, and as long as the requirements of the armed services remain at their present level of one medical officer per approximately 155 men, the net annual decrease in our civilian medical manpower would appear to be inevitable. On the other hand, the increasing maldistribution of physicians may be attacked through control of the initial locations and of the migration of civilian physicians. Establishment of effective measures along these lines could do much to lessen the severity of developing State and local shortages.

SUMMARY

Estimates are submitted of the number of physicians who will remain in civilian practice in the United States and in selected States as of January 1, 1942, and at 2-year intervals thereafter up to 1950.

It is shown that the national average number of persons per physician will reach 1,500 early in 1944 and will continue to rise at a considerable rate because deaths and retirements are no longer being fully replaced by new additions to the profession. It is further shown that the rate of attrition will tend to be most severe in the States which were medically poor before the war, since these States generally have a high proportion of older physicians and receive an unduly low proportion of new medical graduates. Twenty-eight

States, with a combined population of 54,500,000, are expected to have more than 1,500 persons per physician by January 1, 1944, and seven of these, with 13,500,000 population, will have more than 2,000.

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Appendix

SOURCES OF DATA

1. Census of Physicians of the Committee on Medical Preparedness of the American Medical Association, tabulated by the United States Public Health Service, for total physicians, full-time appointments, and age distribution by States.
2. Hospital Number, 1942, Journal of the American Medical Association, for interns and residents by States.
3. Educational Number, 1942, Journal of the American Medical Association, for present and anticipated number of new medical graduates.
4. State Board Numbers, 1941 and 1942, Journal of the American Medical Association, for distribution of newly licensed physicians by States.
5. Procurement and Assignment Service, War Manpower Commission, for unpublished data on recruitment of physicians by States.
6. United States Bureau of the Census estimates for population distribution by States, 1943.
7. Unpublished material, Division of Public Health Methods, National Institute of Health, United States Public Health Service, for age-specific death rates and age-specific retirement percentages for physicians.

ASSUMPTIONS

In order to make estimates of the numbers of physicians at future dates it has been assumed:

1. That the procurement objectives up to January 1, 1944, will be met from the several States in the proportion that each State had contributed up to the date of the last available data, April 30, 1943.
2. That all new medical graduates will enter the armed services on completion of their internships, except for 20 percent who will be physically disqualified.
3. That the physically disqualified new graduates will locate in the several States in proportion to the numbers of new physicians locating in each State during the 2-year period 1940–41.
4. That the numbers of interns, residents, and full-time salaried physicians remaining after recruitment on January 1, 1944, will continue to be distributed among the several States in the proportions which prevailed in 1942.

5. That no allowance can be made for physicians reentering civilian practice after discharge from the services since (*a*) their number and effectiveness cannot be predicted and (*b*) replacements for these losses may be required by the Army and Navy causing further recruitment from among civilian practitioners in 1944 and thereafter.

6. That changes in State population due to interstate migration after January 1, 1943, would be negligible, and that the population of each State would thereafter change in proportion to the increase or decrease for the country as a whole.

SUMMARY OF METHOD

(*a*) National figures: For 1942 the figure for total physicians was reduced by the sum of full-time appointments, interns, and residents to give private practitioners, and by the age specific retirement percentages to give active private practitioners. To obtain the 1944 figure the total number of physicians in 1942 was reduced by the total Army and Navy procurement objective (not including recruits from among new graduates) for the 2-year period, by deaths during the 2-year period (based on age-specific death rates), by interns, residents, and full-time appointments expected to remain after recruitment, and by the retirement correction applied to the new age distribution. Figures at the subsequent dates were derived by subtracting calculated deaths in each age group for each 2-year interval and recalculating the correction for retirements on the basis of the new age distribution.

(*b*) State figures: Computations were made for all States for 1942 and 1944, using the sources mentioned above for the data on distribution of the various categories of physicians by States, and the same method as used for the United States total. Estimates for the subsequent dates were made for only 17 States, selected by taking every third State in alphabetical order. These States were ranked by the 1942 ratio of persons per physician and 6 were selected which would demonstrate without undue crowding on figure 2 the trends shown for the 17.

FREQUENCY AND DURATION OF DISABILITIES CAUSING ABSENCE FROM WORK AMONG THE EMPLOYEES OF A PUBLIC UTILITY, 1938–42 [1]

By W. M. Gafafer, *Principal Statistician, United States Public Health Service*

The present report is the eighth of a series (*1–7*) on disability among employees of the Boston Edison Company and is based on recorded absences due to disability lasting 1 calendar day or longer which ended during the 5 years 1938–42. The material is presented at this time principally because of the extraordinary interest in absenteeism shown by industry, war and health agencies, and others engaged in the war effort. It is believed that the analyses will be found useful in making the necessary comparisons leading to measures for the reduction and control of sickness absenteeism.

With regard to the age distribution of the employees, approximately 50 percent of the males were under 40 years of age in 1940 while the corresponding percentage for the females was 60. Possible changes

[1] From the Division of Industrial Hygiene, National Institute of Health.

in the age composition of the employees in 1941 and 1942 may be associated with changes in morbidity. Of importance also in this connection are possible changes in the occupational distribution of the employees. Should the requisite data become available, a forthcoming comprehensive study will include an examination of the factors of age and occupation.

Table 1 shows for each sex and year the number of person-years of exposure and the number of absences and days of disability according to broad cause group. Table 2 is derived from table 1 and presents three pertinent morbidity indexes by year and sex according to broad cause group.

INJURIES

It will be observed in table 2 that the average annual number of absences per 1,000 males on account of industrial injuries has increased since 1939, the rate for 1942 being well above the rate for 1941 and the average rate for the 5 years; the rate for nonindustrial injuries, on the other hand, has decreased since 1939, the rate for 1942 being slightly less than the rate for 1941 and below the mean for the 5 years. The annual industrial injury rates for the females are consistently lower than the corresponding rates for the males, as might be expected, while the nonindustrial injury rates are consistently higher.

In 1942 the average annual number of days absent per male on account of industrial injuries reached a maximum of almost 1.4 days. While the male nonindustrial injury rate is the highest since 1939, it is slightly below the mean for the 5 years. When the female experience is compared with that of the males, the rate is generally lower for industrial injuries and higher for nonindustrial injuries.

The 5-year average for the number of days per male absence on account of industrial injuries is approximately 32 days, the corresponding average for the females being 36. Nonindustrial injuries show 5-year averages of 11 and 14 days for males and females, respectively.

SICKNESS

The material covering the sickness indexes shown in table 2 is presented graphically in figure 1. Each bar in the figure for a particular year represents the value of an index for all causes of sickness and the contribution made to that value by a particular cause group; the bars representing days per absence are for particular broad cause groups since this index is not additive. The figure thus shows for two indexes and each sex the variation with time of all sickness, and each of three broad cause groups; for the third index the variation with time is shown for each of the three broad cause groups.

Number of absences per 1,000 persons.—It may be seen in table 2 that the male rate for 1942 is over 1,000 absences per 1,000 which is

Attention is also directed in the instance of the males to the similarity of the magnitude of the contributions to all sickness made by the digestive and the nonrespiratory-nondigestive diseases, while with respect to the females the contributions made by the nonrespiratory-nondigestive diseases are larger than those made by the digestive diseases.

Days per person.—The average annual number of days absent per male on account of sickness increased to a maximum of 8 for 1942 which represents an excess of 9 and 11 percent when compared with

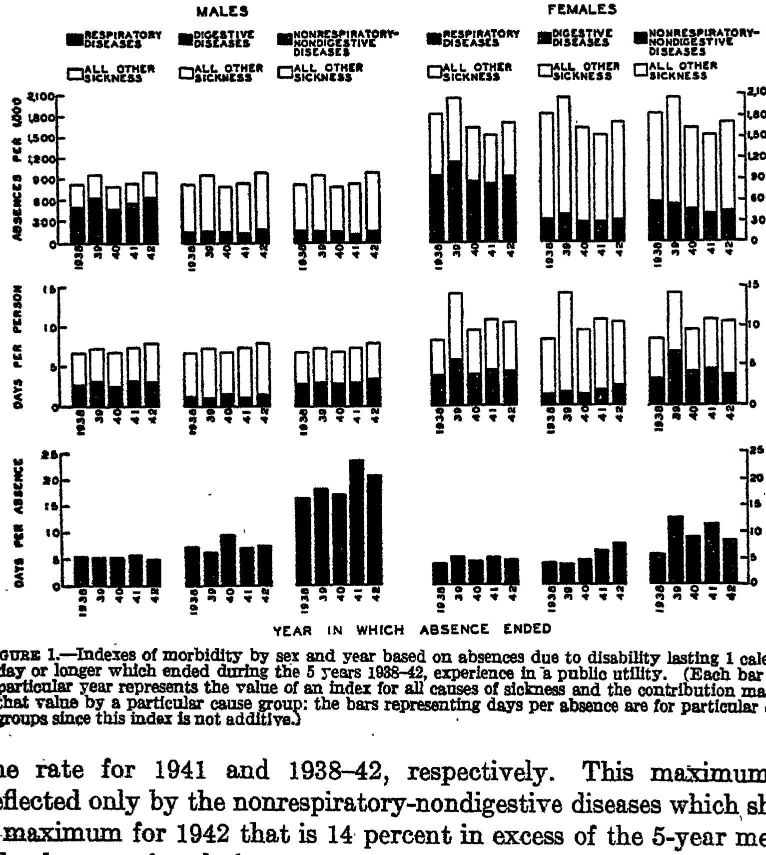

FIGURE 1.—Indexes of morbidity by sex and year based on absences due to disability lasting 1 calendar day or longer which ended during the 5 years 1938–42, experience in a public utility. (Each bar for a particular year represents the value of an index for all causes of sickness and the contribution made to that value by a particular cause group: the bars representing days per absence are for particular cause groups since this index is not additive.)

the rate for 1941 and 1938–42, respectively. This maximum is reflected only by the nonrespiratory-nondigestive diseases which show a maximum for 1942 that is 14 percent in excess of the 5-year mean. The days per female for 1942 are over 10, a rate which differs slightly from the 5-year mean but yields a decrease of 26 percent when compared with the rate for 1939. Among the females the digestive disease group is the only one presenting a maximum rate for 1942, being 47 percent in excess of the 5-year mean.

The figure shows graphically by sex the relative importance of the three disease groups with reference to the number of days absent per person. It appears that for the males as well as for the females the

digestive diseases contribute least to the average annual number of days absent per person; the respiratory group and the nonrespiratory-nondigestive group, on the other hand, yield larger rates and it will be observed that for the males and females the contributions made by the two disease groups are similar in magnitude.

In this connection it is of interest to examine the percentage contribution made by each disease group to the total average annual number of days absent per male and female on account of sickness. Forty-one percent and 42 percent of the male rate for 1938–42 are accounted for by the respiratory and nonrespiratory-nondigestive diseases, respectively, while the remainder, 17 percent, is yielded by the digestive diseases. Approximately the same percentages hold for 1942, and for the females for 1938–42. The female percentage distribution for 1942, however, shows an interesting though not spectacular interchange between the digestive and nonrespiratory-nondigestive groups, the percentages for 1942 being 41, 24, and 35 for the respiratory, digestive, and nonrespiratory-nondigestive groups, respectively; for 1938–42 the corresponding percentages in order are 42, 16, and 42.

Number of days per absence.—Table 2 reveals that industrial injuries generally yield absences of longest duration. It will be observed with reference to sickness that for each sex and year the nonrespiratory-nondigestive diseases present the longest absences; for the 5-year period these durations are approximately 19 days for males and 9 days for females. This disease group is followed by the digestive diseases, 8 days for males and 5 days for females, while the respiratory group presents 5 days for males and less than 5 days for females. It is noteworthy that with only one exception all of the rates for 1942 presented by the three disease groups are not substantially different from the corresponding means for 1938–42. The exception is the digestive disease rate for females which is 52 percent in excess of the 5-year mean and has increased annually since 1939.

The lowest third of the figure presents graphically by sex and for each of the three disease groups the variation of absence duration with time. The nonrespiratory-nondigestive diseases present striking durations particularly for the males. Noteworthy increases with time are shown only by the digestive diseases for the females. While the male frequency of absences together with the days absent per male for all sickness continued to increase annually since 1940, it is of interest to observe that the absence durations specific for disease group behave otherwise. Thus from 1941 to 1942 the respiratory and nonrespiratory-nondigestive diseases decreased sensibly while the digestive diseases showed a slight increase. The females, on the other hand, show an increase from 1941 to 1942 in the frequency of all sick-

ness together with a slight decrease in days absent per female. The duration of absence for this period shows an increase only for the digestive diseases, the respiratory and nonrespiratory-nondigestive diseases showing decreases.

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OUTBREAK OF INFANT DIARRHEA IN A MAINE HOSPITAL

Information has been received regarding a recent outbreak, with a high fatality rate, of diarrhea of the newborn in a Maine hospital. There were 26 cases in babies born in the hospital in which the outbreak occurred and 2 in infants born elsewhere but entered in that hospital for other reasons and subsequently developing diarrhea. One case was in a grandfather, who developed diarrhea about 5 days after contact with one of the babies. Of the 28 cases occurring in babies, 14 of the infants died. The first case developed in a baby born on July 27 and the last case in one born on August 29. No cases developed in infants born after the existence of the outbreak was recognized and control measures were instituted. The disease was reported to have been insidious in its onset, and the outbreak was in progress and did not come to light until several babies born in the hospital had died at other local hospitals.

An increase in mortality from diarrhea of the newborn was reported in San Francisco, California, earlier in the year. For the first four months of this year deaths from diarrhea constituted 15 percent of the total infant deaths in that city, as compared with 8 percent in infants under one year of age and 1.7 percent in those under one month for the country as a whole in 1941.

Under date of April 3, 1943, the California State Board of Public Health revised the regulations for the control of communicable diseases. In addition to requiring that epidemic diarrhea of the newborn be reported, as formerly, the condition was defined and the isolation of infant patients was required. Specific measures were set forth regarding isolation.[1]

[1] Increase in infant mortality and infant diarrhea in San Francisco, California. Pub. Health Rep. June 11, 1943, p. 917.

DEATHS DURING WEEK ENDED OCTOBER 2, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 2, 1943	Corresponding week, 1942
Data from 88 large cities of the United States:		
Total deaths	8,340	8,225
Average for 3 prior years	7,906	
Total deaths, first 39 weeks of year	353,227	324,730
Deaths under 1 year of age	618	635
Average for 3 prior years	556	
Deaths under 1 year of age, first 39 weeks of year	25,318	22,161
Data from industrial insurance companies:		
Policies in force	65,874,191	65,065,862
Number of death claims	11,687	11,029
Death claims per 1,000 policies in force, annual rate	9.3	8.8
Death claims per 1,000 policies, first 39 weeks of year, annual rate	9.8	9.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 9, 1943

Summary

The decline in the poliomyelitis incidence continued, a total of 515 cases being reported for the current week as compared with 679 for the preceding week and a 5-year median of 391 for the corresponding week. The current figure brings the cumulative total for the first 40 weeks of the year to 9,824, the largest number for the corresponding period of any other year since 1931 when 13,050 cases had been reported, which was approximately 83 percent of the total of 15,745 cases reported for that entire year.

During the current week decreases were recorded for all geographic areas except the Mountain States. Only eight States reported more than 17 cases currently, as follows (last week's figures in parentheses): *Increases*—Minnesota 22 (9), Utah 24 (18), Washington 30 (19), and Oregon 33 (29); *decreases*—Illinois 91 (118), Kansas 23 (32), and California 49 (98); *no change*—New York 52 (52).

A total of 191 cases of meningitis was reported, as compared with 192 last week and a 5-year median of 26. States reporting 6 or more cases (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 14 (10), Connecticut 8 (2), New Jersey 14 (8), Illinois 17 (13), Michigan 11 (6), Virginia 7 (3), Kentucky 6 (4), and Texas 7 (0); *decreases*—New York 29 (31), Pennsylvania 11 (12), Indiana 6 (8), and California 6 (22); *no change*—Missouri 6 (6). The cumulative total for the first 40 weeks of the year is 14,714, as compared with 2,733 for the same period last year and a 5-year median of 1,618.

Current reports of influenza, measles, and scarlet fever show seasonal increases and are above the corresponding median figures, as well as those for the corresponding week of last year, while those of diphtheria, typhoid fever, and whooping cough are below the respective figures for both last year and the median. Only 5 cases of smallpox were reported.

Deaths registered for the week in 87 large cities of the United States totaled 8,044, as compared with 8,171 last week and a 3-year (1940–42) average of 7,915. The cumulative figure for the first 40 weeks of the year is 352,576, as compared with 325,568 for the same period in 1942.

Telegraphic morbidity reports from State health officers for the week ended October 9, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42	Week ended		Median 1938-42
	Oct. 9, 1943	Oct. 10, 1942		Oct. 9, 1943	Oct. 10, 1942		Oct. 9, 1943	Oct. 10, 1942		Oct. 9, 1943	Oct. 10, 1942	
NEW ENGLAND												
Maine	1	0	0	1	------	------	55	6	8	5	0	0
New Hampshire	0	1	0	------	------	------	4	3	3	0	0	0
Vermont	0	0	0	------	------	------	50	20	0	0	0	0
Massachusetts	3	3	4	------	------	------	50	53	53	14	1	1
Rhode Island	0	3	0	------	------	------	1	7	2	2	1	0
Connecticut	0	0	0	5	3	1	3	10	5	8	2	1
MIDDLE ATLANTIC												
New York	9	9	10	[1] 5	[1] 15	[1] 8	92	76	48	29	16	3
New Jersey	2	1	3	4	7	6	100	29	24	14	0	0
Pennsylvania	4	6	8	------	4	------	41	60	60	11	4	1
EAST NORTH CENTRAL												
Ohio	11	18	30	1	4	4	90	18	18	5	2	2
Indiana	12	6	14	11	20	7	25	4	2	6	0	0
Illinois	10	10	17	6	4	4	37	18	18	17	5	1
Michigan [2]	6	8	8	------	10	5	182	24	30	11	2	2
Wisconsin	4	0	1	25	11	19	148	39	39	8	0	0
WEST NORTH CENTRAL												
Minnesota	9	2	2	------	------	1	182	4	4	1	1	0
Iowa	5	5	5	------	7	5	12	5	6	1	0	0
Missouri	1	4	6	------	4	2	1	11	3	6	0	0
North Dakota	2	3	2	5	8	5	102	11	6	0	0	0
South Dakota	3	3	4	------	------	------	5	3	3	0	3	0
Nebraska	6	2	1	------	2	------	1	11	10	0	0	0
Kansas	1	6	6	2	3	3	4	7	4	1	0	1
SOUTH ATLANTIC												
Delaware	0	1	1	------	------	------	1	0	0	0	0	0
Maryland [3]	2	11	7	1	2	2	7	4	5	8	5	1
District of Columbia	0	3	3	------	------	------	1	2	2	1	0	0
Virginia	15	39	39	83	107	67	46	11	11	7	4	0
West Virginia	12	10	10	------	6	7	5	1	1	1	1	1
North Carolina	48	90	99	12	2	2	20	5	15	1	2	1
South Carolina	25	48	26	189	195	139	28	7	6	1	0	0
Georgia	31	32	44	4	12	18	2	10	3	4	2	0
Florida	5	11	9	12	------	1	5	0	0	2	0	0
EAST SOUTH CENTRAL												
Kentucky	12	16	16	2	1	1	3	2	9	6	1	1
Tennessee	25	8	12	2	15	14	1	6	6	2	0	0
Alabama	29	25	32	27	15	12	5	3	5	3	0	1
Mississippi [2]	13	23	24	------	------	------	------	------	------	3	1	0
WEST SOUTH CENTRAL												
Arkansas	5	20	20	22	28	20	3	2	1	0	0	0
Louisiana	4	1	9	3	7	5	17	5	3	2	0	0
Oklahoma	8	10	14	12	31	28	3	3	3	0	0	0
Texas	34	61	53	677	458	143	14	15	15	7	0	0
MOUNTAIN												
Montana	1	2	2	2	------	2	37	6	12	0	1	0
Idaho	0	1	0	------	3	1	0	17	3	0	0	0
Wyoming	0	0	0	8	24	------	25	4	4	1	0	0
Colorado	3	18	16	15	31	11	2	8	12	1	0	0
New Mexico	1	0	3	------	------	------	2	0	4	0	0	0
Arizona	0	1	1	80	38	39	6	3	3	2	0	0
Utah [3]	0	0	0	------	------	1	7	113	5	1	0	0
Nevada	0	0	0	1	------	------	13	1	0	0	0	0
PACIFIC												
Washington	11	5	1	------	1	------	23	69	15	2	1	0
Oregon	1	3	3	24	3	6	21	49	14	1	1	0
California	13	21	12	5	17	20	41	56	77	6	6	1
Total	387	550	599	1,246	1,098	759	1,523	821	824	191	62	26
40 weeks	9,450	9,924	10,782	87,071	85,868	154,626	544,415	470,869	470,869	14,714	2,733	1,618

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 9, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Oct. 9, 1943	Oct. 10, 1942		Oct. 9, 1943	Oct. 10, 1942		Oct. 9, 1943	Oct. 10, 1942		Oct. 9, 1943	Oct. 10, 1942	
NEW ENGLAND												
Maine	1	0	0	25	3	4	0	0	0	0	0	0
New Hampshire	0	1	1	18	7	1	0	0	0	1	0	0
Vermont	2	5	1	0	5	4	0	0	0	0	0	0
Massachusetts	10	1	2	164	112	57	0	0	0	4	3	2
Rhode Island	5	0	0	5	9	3	0	0	0	0	0	0
Connecticut	10	2	1	22	23	13	0	0	0	1	4	4
MIDDLE ATLANTIC												
New York	52	20	20	144	133	101	0	0	0	13	10	11
New Jersey	4	13	10	41	44	33	0	0	0	3	3	3
Pennsylvania	7	10	11	102	102	102	0	0	0	16	13	15
EAST NORTH CENTRAL												
Ohio	14	4	12	186	122	122	0	0	0	4	6	16
Indiana	10	1	3	56	39	44	1	0	1	3	3	3
Illinois	91	35	18	79	103	116	1	0	0	5	16	16
Michigan [2]	16	5	19	67	61	100	0	0	0	3	3	6
Wisconsin	14	7	7	129	99	69	1	0	0	1	2	2
WEST NORTH CENTRAL												
Minnesota	22	2	15	61	40	32	0	0	0	0	0	0
Iowa	17	3	3	48	26	34	1	0	0	0	2	3
Missouri	9	7	1	37	36	36	0	0	0	7	9	9
North Dakota	0	2	1	6	4	8	0	0	0	2	0	1
South Dakota	2	0	1	23	21	12	0	1	0	0	0	1
Nebraska	7	5	1	4	7	9	0	0	0	0	0	2
Kansas	23	4	4	66	55	55	0	0	0	0	0	2
SOUTH ATLANTIC												
Delaware	1	1	0	3	7	6	0	0	0	0	0	0
Maryland [2]	2	0	2	16	31	18	0	0	0	2	4	5
District of Columbia	2	1	1	13	14	8	0	0	0	0	1	1
Virginia	0	1	2	22	50	32	0	0	0	4	6	7
West Virginia	1	2	2	77	62	46	1	0	0	6	6	6
North Carolina	2	11	4	122	110	77	0	0	0	2	4	4
South Carolina	0	3	3	15	8	11	0	0	0	9	3	7
Georgia	1	1	2	31	48	29	0	0	0	7	3	7
Florida	0	2	1	4	4	4	0	0	0	1	1	1
EAST SOUTH CENTRAL												
Kentucky	3	2	6	35	26	43	0	1	0	3	10	11
Tennessee	0	3	3	36	67	67	0	1	0	4	5	7
Alabama	0	0	1	23	30	29	0	0	0	0	1	6
Mississippi [2]	1	2	1	10	15	14	0	0	0	7	3	3
WEST SOUTH CENTRAL												
Arkansas	------	3	2	10	2	11	0	0	0	3	3	13
Louisiana	2	0	0	3	3	3	0	0	0	1	6	10
Oklahoma	6	0	3	8	22	16	0	0	1	4	2	6
Texas	15	7	7	31	35	21	0	0	0	9	9	17
MOUNTAIN												
Montana	1	0	1	14	6	11	0	0	0	0	0	0
Idaho	0	0	0	28	10	4	0	0	0	2	1	1
Wyoming	3	0	0	2	0	3	0	1	0	1	0	0
Colorado	15	3	2	11	21	17	0	0	1	0	1	3
New Mexico	3	2	1	5	4	4	0	0	0	5	9	7
Arizona	4	1	0	5	6	4	0	0	0	1	5	2
Utah [2]	24	5	2	12	10	8	0	0	0	0	2	2
Nevada	1	0	0	2	0	0	0	0	0	0	1	0
PACIFIC												
Washington	30	2	2	46	17	21	0	0	0	1	0	2
Oregon	33	0	1	14	15	15	0	0	0	0	0	0
California	49	10	8	113	47	83	0	0	0	9	3	7
Total	515	189	391	1,994	1,721	1,632	5	4	16	144	163	252
40 weeks	9,824	3,024	5,290	106,353	96,437	124,297	635	644	2,036	4,496	5,513	7,693

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 9, 1943, and comparison with corresponding week of 1942 and 5-year median—Contd.

Division and State	Whooping cough			Week ended October 9, 1943								
	Week ended		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Oct. 9, 1943	Oct. 10, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	13	45	17	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	2	0	0	0	0	0	0	0	0	0
Vermont	20	35	31	0	0	0	0	0	0	0	0	0
Massachusetts	80	156	117	0	0	2	0	1	0	0	0	0
Rhode Island	14	24	24	0	0	0	0	0	0	0	0	0
Connecticut	16	54	47	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	262	295	295	0	1	56	0	0	0	0	0	1
New Jersey	100	115	115	0	1	0	0	0	0	0	0	0
Pennsylvania	129	199	217	1	0	0	0	0	0	2	0	0
EAST NORTH CENTRAL												
Ohio	160	125	125	0	0	1	0	0	0	0	0	0
Indiana	28	23	15	0	0	0	0	2	0	0	0	0
Illinois	136	195	195	0	2	5	0	0	0	0	0	0
Michigan [2]	136	210	210	0	0	5	0	0	0	0	0	0
Wisconsin	226	151	151	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	48	25	32	0	1	0	0	0	0	0	0	0
Iowa	7	17	17	0	0	0	0	0	0	0	0	0
Missouri	14	4	10	0	0	0	2	0	0	0	0	0
North Dakota	11	6	26	0	0	0	1	0	0	1	0	0
South Dakota	2	2	2	0	0	0	0	0	0	0	0	0
Nebraska	12	6	5	0	0	0	0	0	0	0	0	0
Kansas	27	16	16	0	1	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	1	0	0	0	0	0	0	[4] 0	0	0
Maryland [2]	46	75	57	0	0	0	4	0	0	0	0	0
District of Columbia	7	16	14	0	0	0	0	0	0	0	0	0
Virginia	44	8	25	0	0	0	93	0	0	0	0	0
West Virginia	46	14	14	0	0	0	0	0	0	0	0	0
North Carolina	70	58	79	0	0	0	0	0	0	0	2	4
South Carolina	73	21	23	0	1	0	0	0	0	1	0	2
Georgia	3	10	11	0	0	6	0	0	0	0	0	35
Florida	31	7	7	0	1	0	0	0	0	0	0	8
EAST SOUTH CENTRAL												
Kentucky	54	9	58	0	0	0	0	0	0	1	0	0
Tennessee	30	18	27	0	0	0	4	0	0	0	0	2
Alabama	47	24	24	0	0	0	0	0	0	0	0	19
Mississippi [2]	-------	-------	-------	0	0	0	0	0	0	0	0	8
WEST SOUTH CENTRAL												
Arkansas	19	10	7	0	5	23	0	0	0	0	0	0
Louisiana	0	0	3	0	4	4	0	0	0	0	0	10
Oklahoma	3	4	4	0	0	0	0	1	0	0	0	0
Texas	102	94	68	0	23	146	0	0	2	0	0	34
MOUNTAIN												
Montana	15	37	8	0	0	0	0	0	0	0	0	0
Idaho	0	0	1	0	0	0	0	0	0	0	0	0
Wyoming	14	3	2	0	0	0	0	0	0	0	2	0
Colorado	38	30	15	0	0	0	0	0	0	0	0	0
New Mexico	0	3	9	0	1	2	1	0	0	0	0	0
Arizona	15	6	9	0	0	0	17	0	0	0	0	0
Utah [2]	14	14	14	0	0	0	0	0	0	0	2	0
Nevada	0	2	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	52	23	23	0	0	0	0	0	0	0	0	0
Oregon	28	7	10	0	0	0	0	0	0	0	0	0
California	114	154	154	0	0	2	0	5	0	0	0	0
Total	2,306	2,350	2,577	1	41	253	122	9	2	[4] 5	6	123
40 weeks	149,965	141,736	143,682	50	1,675	13,137	3,350	563	21	420	682	3,199
41 weeks, 1942	-------	-------	-------	67	898	9,822	5,581	445	37	438	730	2,678

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: New York, 6; New Jersey, 2; New Mexico, 1.
[4] Exclusive of delayed report (included only in cumulative total) of 1 case in Delaware for the month of June.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 25, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	0	2	2	1	1	0	0	5
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	3	0	------	0	3	10	11	15	26	0	1	15
Fall River	0	0	------	0	0	0	1	2	3	0	0	1
Springfield	0	0	------	0	3	0	1	0	8	0	0	5
Worcester	0	0	------	0	0	0	11	0	16	0	0	7
Rhode Island:												
Providence	0	0	------	0	16	1	1	11	1	0	0	123
Connecticut:												
Bridgeport	0	0	------	0	0	0	1	3	0	0	0	6
Hartford	0	0	------	0	0	1	1	0	0	0	0	1
New Haven	0	0	------	0	1	0	0	2	1	0	0	3
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	2	3	6	4	2	0	2	4
New York	9	0	3	0	24	8	39	39	56	0	2	93
Rochester	0	0	------	0	0	1	3	2	3	0	1	3
Syracuse	0	0	------	0	2	1	0	1	0	0	0	12
New Jersey:												
Camden	3	0	------	0	0	1	0	0	0	0	0	0
Newark	1	0	------	0	2	3	2	2	2	0	0	15
Trenton	0	0	------	0	0	0	0	0	1	0	1	0
Pennsylvania:												
Philadelphia	2	1	2	1	3	8	14	3	10	0	3	31
Pittsburgh	1	1	1	1	10	0	9	0	9	0	1	5
Reading	0	0	------	0	1	0	0	0	0	0	0	5
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0	------	0	1	0	0	5	11	0	0	0
Cleveland	0	0	2	1	1	2	10	1	27	0	1	12
Columbus	0	0	------	0	0	0	3	0	14	0	0	6
Indiana:												
Fort Wayne	16	0	------	0	0	1	1	0	1	0	0	0
Indianapolis	4	0	------	0	0	0	6	1	7	0	0	18
South Bend	0	0	------	0	3	0	0	0	2	0	0	1
Terre Haute	0	0	------	0	0	0	1	0	0		0	0
Illinois:												
Chicago	1	0	------	1	5	15	15	66	12	0	0	81
Springfield	0	0	------	0	2	1	5	0	1	0	0	0
Michigan:												
Detroit	4	0	------	0	6	4	8	5	18	0	2	27
Flint	0	0	------	0	4	0	0	0	0	0	0	4
Grand Rapids	0	0	------	0	0	0	0	3	0	0	0	8
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	2	0	0	0
Milwaukee	0	0	------	0	2	1	0	7	24	0	0	42
Racine	0	0	------	0	0	0	0	2	1	0	0	6
Superior	0	0	------	0	27	0	0	0	0	0	0	4
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	0	0	1	0	1	0	1	5
Minneapolis	0	0	------	0	4	0	3	10	10	0	0	6
St. Paul	3	0	------	0	2	1	4	6	11	0	0	14
Missouri:												
Kansas City	0	0	------	0	1	0	1	5	7	0	0	4
St. Louis	1	0	2	0	1	1	10	1	4	0	0	5

City reports for week ended Sept. 25, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	1	0	------	0	0	1	1	6	7	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	0	0	4	0	0	0
Wichita	0	0	------	0	0	0	1	1	1	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	2	3	1	0	0	0	2
Maryland:												
Baltimore	1	0	------	0	3	3	8	0	7	0	0	59
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	0	1	8	1	5	0	2	19
Virginia:												
Lynchburg	0	0	------	0	4	0	0	0	3	0	0	15
Richmond	0	0	------	0	0	0	0	0	2	0	0	2
Roanoke	0	0	------	0	0	0	0	0	0	0	0	5
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	1	0	0	0
Wheeling	0	0	------	0	0	0	2	0	0	0	0	5
North Carolina:												
Wilmington	1	0	------	0	1	0	1	0	1	0	0	0
Winston-Salem	0	0	------	0	0	0	1	0	6	0	0	7
South Carolina:												
Charleston	0	0	------	0	0	1	1	0	1	0	0	1
Georgia:												
Atlanta	2	0	10	0	0	0	1	0	2	0	0	0
Brunswick	0	0	------	0	0	0	1	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	0	0	0	0
Florida:												
Tampa	0	0	------	0	1	0	3	0	0	0	0	1
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	1	1	0	2	0	3	0	0	7
Nashville	0	0	------	0	0	0	2	0	4	0	0	3
Alabama:												
Birmingham	0	0	2	0	1	0	3	0	0	0	0	0
Mobile	1	0	------	0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	2	0	0	0	0
Louisiana:												
New Orleans	0	0	1	1	0	1	6	2	2	0	3	2
Shreveport	1	0	------	0	0	0	1	0	0	0	0	0
Texas:												
Dallas	0	0	------	0	0	0	3	5	1	0	0	6
Galveston	0	0	------	0	0	0	1	2	0	0	0	0
Houston	1	0	------	2	2	1	3	1	1	0	0	6
San Antonio	1	0	------	0	0	0	4	0	0	0	0	2
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	1
Great Falls	0	0	------	0	7	0	0	0	0	0	0	1
Helena	0	0	------	0	0	0	0	0	2	0	0	4
Missoula	0	0	------	0	0	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	2	0	1	0
Colorado:												
Denver	3	0	4	0	1	1	2	1	0	0	1	30
Pueblo	0	0	------	0	1	0	0	10	2	0	0	2
Utah:												
Salt Lake City	0	0	------	0	4	0	0	9	1	0	0	7

City reports for week ended Sept. 25, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	0	0	------	0	4	1	0	4	3	0	0	4
Spokane	2	0	1	0	6	0	1	0	3	0	0	4
Tacoma	1	0	------	1	0	0	2	2	3	0	0	8
California:												
Los Angeles	6	0	5	0	5	1	2	28	17	0	0	80
Sacramento	0	0	------	0	1	0	1	4	0	0	0	2
San Francisco	1	0	1	0	7	2	2	5	8	0	0	10
Total	72	2	34	9	176	80	239	281	384	0	22	822
Corresponding week, 1942	62	0	53	4	131	12	228	48	281	1	28	1,062
Average, 1938-42	74	------	48	[1] 10	[2] 152	------	[1] 234	------	317	1	45	1,087

Anthrax.—Cases: Philadelphia, 1.

Dysentery, amebic.—Cases: Hartford, 1; Chicago, 1; St. Louis, 2; San Francisco, 1.

Dysentery, bacillary.—Cases: New Haven, 2; Buffalo, 7; New York, 128; Rochester, 1; Syracuse, 1; Philadelphia, 1; Detroit, 6; Richmond, 2; Charleston, S. C., 4; Atlanta, 1; Nashville, 2; Los Angeles, 6.

Dysentery, unspecified.—Cases: Richmond, 4; San Antonio, 3.

Tularemia.—Cases: New York, 1; St. Louis, 1; Memphis, 1.

Typhus fever.—Cases: New York, 1; Savannah, 3; Tampa, 1; Memphis, 2; Birmingham, 2; Mobile, 2; Little Rock, 1; New Orleans, 2; Shreveport, 5; Dallas, 3.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,622,000)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza Case rates	Influenza Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
New England	7.5	0 0	0.0	0.0	57.1	34.8	72.1	84.5	139.1	0.0	2.5	412
Middle Atlantic	7.1	0.9	2.7	0.9	19.6	11.1	32.6	22.7	37.0	0 0	4 5	75
East North Central	15.8	0.0	1.2	1.2	29.8	14.0	28.6	52.6	70.1	0.0	1.8	122
West North Central	10.1	0.0	4.1	0 0	16.2	6 1	42 6	58.8	91.3	0 0	2.0	69
South Atlantic	6.8	0.0	17.1	0 0	17.1	12.0	49.7	3.4	47.9	0.0	3.4	199
East South Central	5.9	0.0	11.9	5.9	11.9	0.0	47.5	0 0	41.6	0.0	0.0	59
West South Central	8.8	0 0	2 9	8 8	5 9	5.9	55 7	35 2	11.7	0.0	8.8	47
Mountain	24.1	0.0	32.2	0 0	104.5	8.0	24 1	160.8	56.3	0.0	16.1	362
Pacific	17.5	0.0	12.2	1.7	40.2	7.0	14.0	75.2	59.4	0.0	0.0	101
Total	10.8	0 3	5.1	1.4	26.5	12.0	36.0	42.3	57.8	0.0	3.3	124

PLAGUE INFECTION IN CALIFORNIA AND MONTANA

Plague infection has been reported proved in pools of fleas from burrows and rodents collected in California and Montana on the dates given as follows:

CALIFORNIA

Lassen County: June 2, 1942, 200 fleas from *C. beldingi* ground squirrel burrows on a ranch 3 miles south and 9 miles east of Amedee; June 25, 1942, 9 fleas from 2 ground squirrels, *C. oregonus*, found dead on a ranch on Willow Creek, 7 miles south and 4½ miles east of Susanville.

Mono County: August 12, 1943, 17 fleas from 18 golden mantled ground squirrels taken at June Lake Lodge, June Lake.

Monterey County: August 20, 1943, a pool of 97 fleas from 16 ground squirrels, *C. beecheyi*, and another pool of 89 fleas from 16 ground squirrels, same species, taken from a ranch 9 miles south and 3 miles west of King City.

MONTANA

Custer County: September 13, 1943, 176 fleas from 41 prairie dogs, *Cynomys ludovicianus*, taken 13 miles southeast of Miles City along U. S. Highway No. 212, and 13 miles south along Toung River Road.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—A total of 325 cases of dengue fever have been reported up to October 3, 1943, in Honolulu, Hawaii Territory.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 11, 1943.—During the week ended September 11, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		6	7	10	17	5	8	8	20	81
Diphtheria		10	5	21		1	1	6		44
Dysentery (bacillary)							1			1
Encephalitis, infectious						1				1
German measles				1	5			2	2	10
Influenza		5			17	3			1	26
Measles	2	1		69	37	21	7	30	13	180
Meningitis, meningococcus			1	1	3				1	6
Mumps		4		18	54	9	2	10	12	109
Poliomyelitis			2	8		2		1		13
Scarlet fever		7	4	46	30	15	11	16	9	138
Tuberculosis (all forms)	5	2	1	70	55	8	14		18	173
Typhoid and paratyphoid fever		1		19	7	1		5		33
Undulant fever				4		1				5
Whooping cough		25		206	132	12	28	57	16	476

CUBA

Habana—Communicable diseases—4 weeks ended July 24, 1943.—During the 4 weeks ended July 24, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	34		Scarlet fever	5	
Dysentery	1	1	Tuberculosis	7	3
Malaria	7	1	Typhoid fever	26	
Measles	9				

FINLAND

Notifiable diseases—July 1943.—During the month of July 1943, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Actinomycosis	1	Mumps	189
Cerebrospinal meningitis	17	Paratyphoid fever	261
Chickenpox	366	Pneumonia (all forms)	594
Conjunctivitis	35	Poliomyelitis	13
Diphtheria	477	Puerperal fever	60
Dysentery	17	Rheumatic fever	208
Gastroenteritis	4,142	Scabies	1,376
Gonorrhea	756	Scarlet fever	458
Hepatitis, epidemic	513	Syphilis	532
Influenza	314	Tetanus	1
Laryngitis	12	Typhoid fever	20
Lymphogranuloma inguinale	1	Vincent's angina	15
Malaria	1	Whooping cough	607
Measles	1,417		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

French West Africa—Dakar.—For the period September 1–10, 1943, 1 case of plague with 1 death was reported in Dakar, French West Africa.

Morocco—Marrakech.—For the period August 1–10, 1943, 1 case of plague was reported in Marrakech, Morocco.

Senegal—Thies District.—For the period August 21–31, 1943, 5 fatal cases of plague were reported in Thies District, Senegal.

Smallpox

Algeria.—For the period August 21–31, 1943, 28 cases of smallpox were reported in Algeria.

Morocco.—For the first 10 days of August 1943, 24 cases of smallpox were reported in Morocco.

Sudan (French).—For the period August 21–31, 1943, 77 cases of smallpox with 7 deaths were reported in French Sudan.

Typhus Fever

Algeria.—For the period August 21–31, 1943, 23 cases of typhus fever were reported in Algeria.

Morocco.—For the period August 1–10, 1943, 132 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended September 25, 1943, 25 cases of typhus fever were reported in Rumania.

Yellow Fever

Belgian Congo—Leopoldville.—For the week ended August 28, 1943, 1 case of yellow fever with 1 death was reported in Leopoldville, Belgian Congo.

Senegal—Kolda.—On September 25, 1943, 1 case of yellow fever was reported in Kolda, Senegal.

COURT DECISION ON PUBLIC HEALTH

Garbage—ordinance making collection by unauthorized person unlawful upheld.—(California District Court of Appeal, Third District; *Ex parte Sozzi*, 129 P.2d 40; decided September 2, 1942.) An ordinance and regulation of a sanitary district in California provided in

part that it should be unlawful for any person, other than collectors employed by the district, to collect any garbage or waste therein. In a habeas corpus proceeding by a person convicted of a violation of this provision it was contended by the petitioner that the said provision was void and not within the power of the sanitary district to enact. The State statutes authorized sanitary districts to collect waste and garbage, to make and enforce regulations for garbage removal and all other sanitary purposes not in conflict with State laws, and to do any act necessary or proper to the complete exercise and effect of its powers or for the purposes for which formed. The statutes also made a violation of a district regulation or ordinance a misdemeanor. The petitioner conceded that the district could engage in garbage collection but contended that its right to do so was not exclusive because "a municipal corporation cannot, under grant of a power to regulate a lawful business, either create a monopoly or prohibition." But the State district court of appeal said that the gathering of garbage was not a trade, business, or occupation in any proper sense and that the sanitary district could, under its powers, reserve to itself the exclusive right, through its own agents or employees, to collect garbage within its limits. It could not be said that property rights are affected by a regulation that garbage may not be removed by other than a licensed collector or one having a permit for that purpose.

The appellate court denied the writ.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

Vol. 58 • OCTOBER 22, 1943 • *No. 43*

THE PHYSICALLY HANDICAPPED[1]

By BERNARD D. KARPINOS, *Associate Statistician, United States Public Health Service*[2]

I.

The war and the resulting need for manpower have brought a markedly increasing appreciation of the problem of physically handicapped persons, from the point of view of both military service and the labor force. Among the physically handicapped persons, the blind and the deaf and those who have an orthopedic impairment, the latter constitute a major part of the problem, at least quantitatively. This paper deals principally with this particular group.[3]

While primary attention has been given to the physically handicapped among the younger age groups,[4] and likewise to workers impaired by industrial injuries,[5] no comprehensive data have been available for the population as a whole. Contemporary discussions of the problem on a national basis have been relying mainly on preliminary data from the National Health Survey (*23*).[6] However, the preliminary report on persons with orthopedic impairments was based on 8 cities out of the 83 surveyed by the National Health Survey (*28*). The present paper utilizes the data from the entire Survey, which permit a somewhat wider analysis and add to the reliability of the results.

Being a house-to-house canvass, the National Health Survey[7] was naturally subjected to the shortcomings characteristic of such surveys. As a precaution, it seems desirable to state some of these

[1] From the Division of Public Health Methods, National Institute of Health. Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration. (Official Projects Nos. 712159-658/9999 and 765-23-3-10.)

[2] At present First Lieutenant in the Army of the United States, Office of the Surgeon General.

[3] See Britten (*6*) for a study of the blind, and Beasley (*5*) for a study of the deaf. Combined estimates of the blind, the deaf, and persons with orthopedic impairments in the United States are presented in section II (table 11).

[4] See Gooch (*11*), Baker (*3*), and Hood (*13*) on crippled children; also Holland (*12*) on the disabling diseases of childhood. Holland's study is based on Health Survey data. (For a complete list of Health Survey studies, see reference 24.)

[5] See Kossoris and Kjaer (*19*).

[6] See Walter (*34*), Lynch (*22*), Amato (*1*), Bureau of Employment Service (*9*), and others. Of the older studies, those by Sydenstricker and Britten (*32* and *33*) are well known. The latter studies were based on white males, holders of life insurance policies.

[7] For a complete discussion of the scope and method of the Survey, see (*28*). It might be mentioned here briefly that the Health Survey was carried out in winter, 1935-36. The information was gathered by trained enumerators, in making usually a single visit to each household. The surveyed urban population, on which this study is based, totalled 2.5 million persons.

shortcomings at the very outset. For one thing, the housewife, who was usually the informant, could hardly be expected to have been cognizant of all defects of the members of the family, especially such defects of which the afflicted themselves have been hardly conscious. For another thing—and what may be more important—the informant could have deliberately concealed the defects, and it does not matter (with respect to the effect on the data) whether such deliberate action is rooted in a traditionally misguided philosophy of concealing deformities or whether it springs from economic reasons.[8] Due to these and other [9] factors, the results presented here should be considered as minimum estimates.

EXTENT OF THE PROBLEM

In securing information on this problem one might commonly center his attention first on its quantitative aspects: (*a*) The approximate number of persons in the United States who have orthopedic impairments, the distribution of these persons by age and sex, and the extent of disability from their impairments, and (*b*) the number of persons in the United States who might be expected to acquire new orthopedic impairments each year, and the distribution of these persons by age, sex, and disability from the impairments. In other words: (*a*) What is the prevalence of orthopedic impairments in the United States by age, sex, and disability, and (*b*) what is the yearly expected incidence of new cases of these impairments by age, sex, and disability? Prior to answering these questions, the definitions of an orthopedic impairment and disability will be stated.

As defined for the Survey, an orthopedic impairment is a permanent handicap which has been depriving the afflicted person of the natural use of some portion of his skeletal system. The term "skeletal" has reference to the tissues of the bones, joints, and the neuromuscular mechanisms concerned with the function of the tissues.[10] In detail it refers to lost, crippled, paralyzed, or deformed individual members of the body, or whole parts of the body.[11] This functional deprivation could be either total, as a result of amputation, or congenital absence of a member of the body, or because of complete paralysis; or it could be partial due to congential deformity, or weakening of the neuromuscular mechanisms. The person's ability to carry on his usual activities depends of course upon the nature of the impairment.

Like illnesses, orthopedic impairments were therefore classified by disability. A disabling impairment would thus relate to an impairment which has kept the person from his work, school, domestic

[8] See Collins (*10*) for a general discussion of various types of surveys and their limitations; also Kessler (*15*).

[9] See Lienau (*21*) on the effects of personnel factors on the Survey.

[10] See Osgood (*27*).

[11] These impairments were recorded in detail on the schedule of the Survey, section 47. (See reference *14* or *28*.)

duties, or other usual activities for at least 7 consecutive days during the Survey year. However, because of the comparatively long duration of disability associated with impairments, the term "incapacitating" is used for the sake of emphasis, instead of "disabling." An incapacitating impairment further implies that the impairment was the sole or primary cause of the disability. All remaining impairments were termed nondisabling.[12]

By definition, orthopedic impairments, incapacitating and nondisabling alike, once incurred stay with the afflicted individuals.[13] Therefore, age specific prevalence rates, which show the number of persons of a certain age having an orthopedic impairment, are cumulative. For each age group, the prevalence rate, that is, the number of cases per 100,000 persons, represents impairments of prior years plus impairments which have originated during the specified age period. For example, the prevalence rate of nondisabling impairments for males aged 20–24 (table 1) indicates that out of 100,000 persons of this age, 1,462 persons have acquired during their lifetime one or more orthopedic impairments. The same table shows a corresponding rate of 1,009 per 100,000 males aged 15–19. Obviously, the difference between the two prevalence rates (1,462–1,009) gives the number of new cases that occurred among 100,000 males during the given 5-year age period. The annual incidence of new cases equals such differences divided by 5.[14] The prevalence rates (table 1)[15] and the annual incidence rates are graphically presented in figures 1 and 2, respectively—differentiated by sex and disability.[16]

The outstanding feature of these rates is the generally higher incidence, and therefore higher prevalence, of both incapacitating and nondisabling impairments among the male population than among the female population. In the younger age groups the higher incidence among males is presumably due to the fact that boys are generally more active than girls,[17] and in the following years this higher incidence is due, of course, to occupational hazards encountered by the males.

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[12] For further details on disability, see (*8*) and (*23*).

[13] It might be recalled here that permanence of the handicap constituted an integral part of the definition.

[14] Certain assumptions are involved in such computations, as (*a*) continuance of prevailing incidence, (*b*) mortality among the handicapped persons identical with that among the total population, and (*c*) constant incidence within the given age groups. The assumptions are well known, and any elaboration is deemed unnecessary. (See Britten (*6*) for further discussion of these assumptions.)

[15] The rates given in the table are based on the original rates which were smoothed by means of 5-point moving least square averages (*31*). The original rates were derived from quinquennial age distributions of the orthopedic cases and a comparable age distribution of the Survey population. (See footnote to table 1.) In general, only one orthopedic impairment was coded for each individual. Consequently, the number of cases corresponds on the whole to the number of individuals affected. The number of cases is that found in the population on the day of the visit. Institutionalized cases, that is, persons with orthopedic impairments who were in institutions for the care of the impairment during the entire Survey year, are not included here.

[16] While the prevalence rates are based on 5-year age intervals (fig. 1), the incidence rates are based on 10-year age intervals (fig. 2) for the sake of smoothness.

[17] This fact was brought out in the study on home accidents (*7*).

TABLE 1.—*Age specific prevalence rates of incapacitating and nondisabling impairments among the urban population of the United States, by sex. (Based on National Health Survey data, 1935–36)* [1]

Age groups	Number of cases per 100,000 persons			
	Incapacitating impairments		Nondisabling impairments	
	Males	Females	Males	Females
Under 5	60	51	253	164
5–9	82	82	471	346
10–14	94	95	684	462
15–19	105	99	1,009	540
20–24	119	105	1,462	601
25–29	127	112	1,909	678
30–34	143	120	2,330	718
35–39	194	127	2,904	774
40–44	277	128	3,396	874
45–49	365	169	3,755	1,072
50–54	479	225	4,180	1,339
55–59	677	319	4,849	1,740
60–64	949	445	5,552	2,178
65–69	1,244	734	6,247	2,760
70–74	1,554	980	6,950	3,534
75–79	1,911	1,391	7,659	4,308
80–84	2,310	1,753	8,374	4,833
85–89	2,751	2,122	9,096	5,189
90 and over	3,233	2,372	9,825	5,527

[1] Derived from the original quinquennial age specific rates which were smoothed by means of 5-point moving least square averages (*31*). The original rates were computed from the data given in table 1 (appendix).

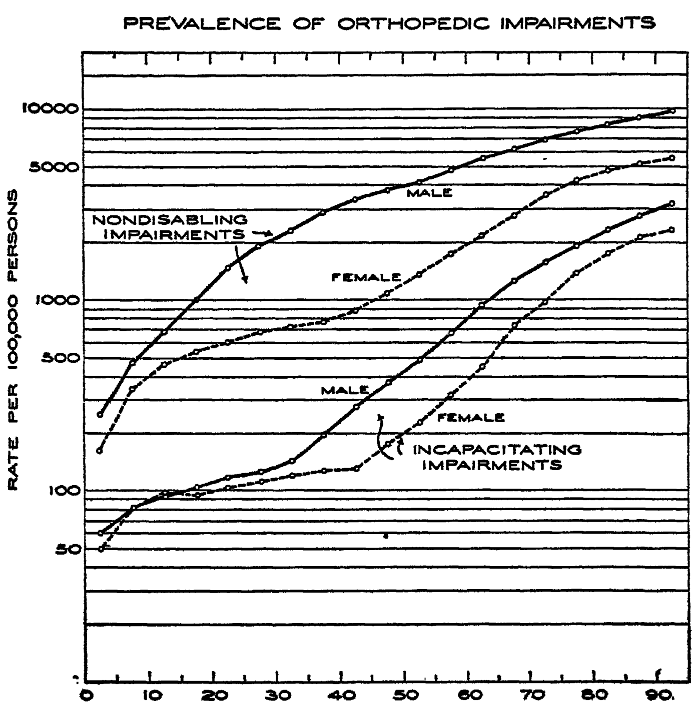

FIGURE 1.—Prevalence rates of incapacitating and nondisabling impairments among the urban population of the United States, 1935–36, by age and sex. (Based on table 1.)

The differences stand out particularly in the incidence of nondisabling impairments (fig. 2). Among females, the incidence of these impairments shows a general downward trend from childhood to age 35, and then an upward turn, due to the factor of aging. Among males the incidence exhibits a sharp rise within the 15 to 25 age period—the usual age of males for entering the labor market. There is some decline in the 35 to 45 age period, which in part might be attributed probably to the fact that for a certain proportion of the males it is the age of retirement from the labor market. There is an upward trend for males from then on—again due undoubtedly to aging. Of course, it is pos-

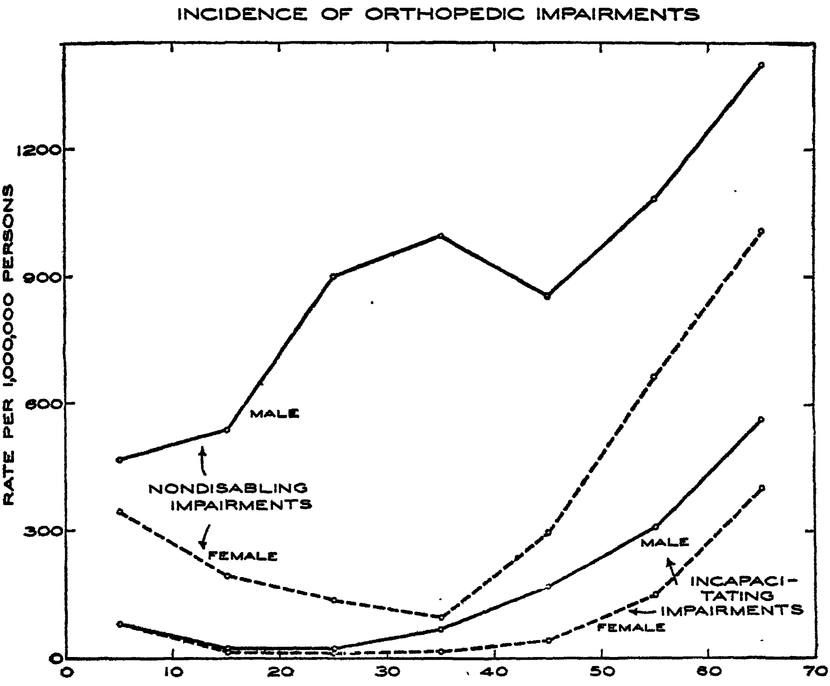

FIGURE 2.—Annual incidence rates of incapacitating and nondisabling impairments among the urban population of the United States, 1935–36, by age and sex. (Based on table 1.)

sible that the decrease in the incidence rates of impairments among males in the middle age groups might be explained by the fact that the males in the younger age groups who are more careless and prone to accidents (lack of experience might be to a large extent responsible for it) are impaired first. Such a fact would cause a subsequent drop in the incidence rates of middle age groups, until aging *per se* becomes the important factor. Only specific studies could supply the proper information for an adequate analysis of these trends in incidence.

Based on these age specific prevalence and incidence rates, two estimates were made: (*a*) Estimate of persons with orthopedic im-

pairments in the United States as of 1940 (table 2), and (*b*) expected annual number of new cases of orthopedic impairments in the United States (table 3). The United States population distributed by 5-year age groups, as given in the 1940 Census, was taken as the population base. The estimates are given separately for various age groups, for both incapacitating and nondisabling impairments.

TABLE 2.—*Estimated number of persons with orthopedic impairments among the male and female population of the United States as of 1940, classified by disability*

Age and sex	Number of persons having		Number of persons with orthopedic impairments		All impairments [3]
	Incapacitating impairments [1]	Nondisabling impairments	Disabled [2]	Not disabled	
	(1)	(2)	(3)	(4)	(5)
Males					
Under 15	13,200	79,700	16,900	76,000	92,900
15-24	13,300	145,600	17,500	141,400	158,900
25-44	35,600	510,100	51,600	494,100	545,700
45-64	76,500	594,100	102,900	567,700	670,600
65 and over	69,900	306,600	94,100	282,400	376,500
Total	208,500	1,636,100	283,000	1,561,600	1,844,600
Percent of "All impairments"	11.3	88.7	15.3	84.7	100.0
Females					
Under 15	12,500	53,500	15,300	50,700	66,000
15-24	12,300	68,700	15,300	65,700	81,000
25-44	24,100	150,700	32,500	142,300	174,800
45-64	34,100	190,300	53,300	171,100	224,400
65 and over	49,500	163,300	72,800	140,000	212,800
Total	132,500	626,500	189,200	569,800	759,000
Percent of "All impairments"	17.5	82.5	24.9	75.1	100.0

[1] Disability solely or primarily caused by the orthopedic impairment.
[2] Includes in addition to the persons shown in column 1, disabled persons with orthopedic impairments whose disability was not due to the orthopedic impairment.
[3] This column is the summation of columns 1 and 2, or 3 and 4.

A total of 1,844,600 males with orthopedic impairments has been estimated for the United States as of 1940 (table 2, column 5), of whom 208,500 persons have incapacitating impairments (column 1) and 1,636,100 persons have nondisabling impairments (column 2). In addition, a total of 759,000 females with such conditions has been estimated (column 5), of whom 132,500 have incapacitating impairments (column 1) and 626,500 have nondisabling impairments (column 2). The estimates postulate of course social conditions of a peacetime economy.

It might be noted that other estimates are given in table 2 (column 3) marked "Persons with orthopedic impairments—disabled." These estimates differ from those in column 1 in that they include besides persons incapacitated because of impairments persons with orthopedic impairments whose disability [18] was not caused by the ortho-

[18] The term "disability" is used here as before; it connotes disability for 7 or more consecutive days during the Survey year.

TABLE 3.—*Estimated annual number of new cases of orthopedic impairments among the male and female population in the United States as of 1940*

Age groups	Males			Females		
	Incapacitating impairments	Nondisabling impairments	Total	Incapacitating impairments	Nondisabling impairments	Total
Under 20	1,160	11,630	12,790	1,050	5,920	6,970
20-39	890	19,750	20,640	300	2,540	2,840
40-54	2,330	10,560	12,890	740	4,350	5,090
55-64	2,500	7,400	9,900	1,120	4,320	5,440
65 and over	2,850	6,190	9,040	2,820	6,020	8,840
Total	9,730	55,530	65,260	6,030	23,150	29,180

pedic impairment. Thus, 11.3 percent of the males with orthopedic impairments are incapacitated because of the impairment, but the total number of disabled persons with orthopedic impairments constitutes 15.3 percent of all those who have an orthopedic impairment. For the females the corresponding percentages are 17.5 and 24.9. In both cases these percentages—the additional number of disabled persons due to other causes—prove the high association of orthopedic impairments with other handicaps or diseases. (See fig. 3.)

By combining the data for males and females of all ages, a total of 2,603,600 persons with orthopedic impairments is obtained for the United States as of 1940,[19] of whom 341,000 persons were afflicted with incapacitating impairments. The annual incidence of new cases (table 3) has been estimated as 65,260 males (9,730 incapacitated because of orthopedic impairments and 55,530 having nondisabling impairments), and 29,180 females (6,030 incapacitated by orthopedic impairments and 23,150 with nondisabling orthopedic impairments). The annual total load of new cases has thus been calculated for the United States as 94,440 persons.

As seen from table 4, the average period of disability caused by an orthopedic impairment during the year preceding the Survey was above 11 months, for all ages. The average yearly disabilities range from a minimum of 9 months for the youngest age group to about 12 months for the oldest ages—for males and females alike.[20] Persons with such impairments may be considered as a totally invalided group. According to above given estimates, 341,000 persons of the

[19] The total estimate (for all ages) given here is in close agreement with that published in the preliminary report (23). However, there is a difference in the estimate of handicapped children under 15 years of age. The preliminary report (23) estimated 210,000 handicapped children, while the present estimate is 158,900 children with orthopedic impairments (table 2, column 5). This discrepancy is explained by the fact that the preliminary report was published before the 1940 Census, consequently the exact number of children in the population was not known.

[20] The lower disability rates of the younger age groups might be explained by the proportionally larger number of new cases in the younger age groups originating at different dates within the year, relative to the number of prevailing (cumulative) cases. Besides, it is probably true that the handicapped persons in the younger age group could more easily adjust themselves to some occupations, thus reducing their rates of disability.

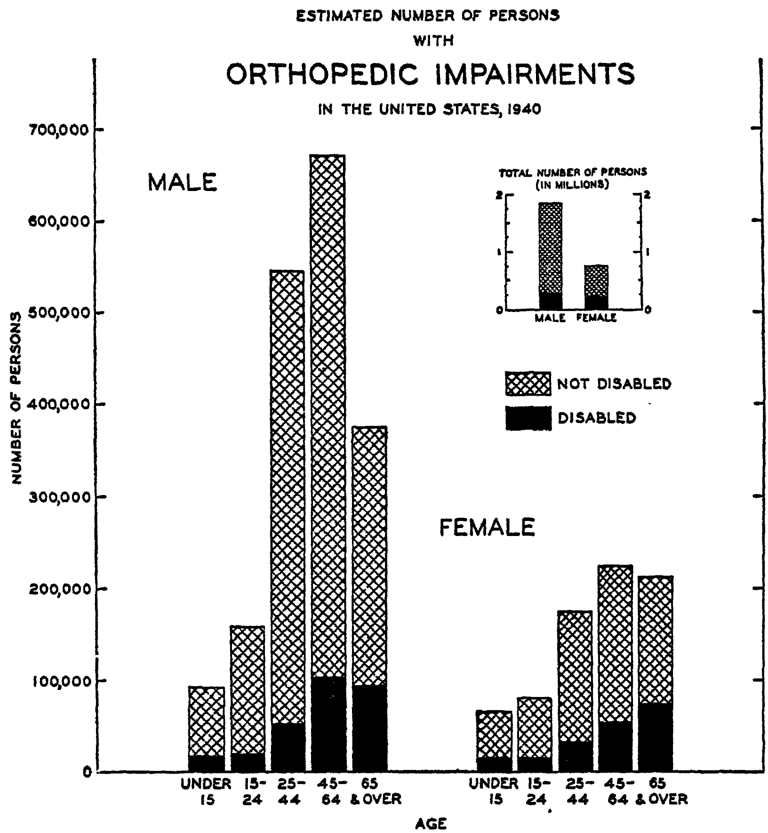

FIGURE 3.—Estimated number of persons with orthopedic impairments in the United States as of 1940, by age, sex, and disability. (Based on table 2.)

United States would be within this category of an invalid population, due to orthopedic impairments.[21]

Several social problems present themselves in this connection. There is (*a*) the combined problem of crippled children and persons of the middle age group, more generally defined as the problem of rehabilitation, and there is (*b*) the problem of crippled aged persons. For these reasons the data were separated here by sex, age, and by seriousness of impairment.

It is fully realized that the Survey data pertained to an urban population, and perhaps primarily to a metropolitan population. (The National Health Survey, though regionally representative of the United States as a whole, was somewhat overrepresented with large cities.)[22] Yet, because of general lack of such information for the

[21] The disability among all disabled persons with orthopedic impairments—whether the disability was caused by the impairment or by some other defect—is only slightly less than 11 months (i. e., 326 days). Therefore, all 472,200 disabled persons (table 2, column 3) might be regarded as an invalid population.

[22] See (*28*) and (*14*).

TABLE 4.—*Number of incapacitating orthopedic impairments and the average days of disability per incapacitating orthopedic case during the 12-month period preceding the National Health Survey, 1935–1936, by age and sex*

Age	Number of incapacitating orthopedic cases of known disability duration		Days of yearly disability per incapacitating case		
	Males	Females	Males	Females	Both sexes
Under 15	237	212	291	273	283
15–24	234	184	317	320	318
25–44	703	402	337	323	332
45–64	1,325	646	348	340	345
65 and over	1,125	821	353	352	353
All ages	3,624	2,265	342	336	339

whole country, national estimates (comprising urban and rural populations) based on these data seemed justifiable. Since these are to be taken as minimum estimates, they appear quite equitable, even if one assumes rural life to be less contributive to such impairments.[23]

EMPLOYMENT STATUS

In order to supply some measure of the extent to which the employment status[24] of handicapped individuals is affected by their impairments, table 5 is presented here. It is quite clear that the incapacitated persons are essentially not in the labor market. Of the incapacitated males aged 25–44 only 16.8 percent were in the labor force, comprising 8.5 percent employed and 8.3 percent on work relief or seeking work; the remainder of this group was either unemployable or stayed at home.[25] Of the incapacitated males aged 45–64 only 10.5 percent were in the labor force, comprising 4.5 percent employed and 6.0 percent on work relief or seeking work. Of the younger males aged 15–24 only 12.4 percent were in school as compared with 38.2 percent in school, as reported for the remaining population.[26]

A comparison of employment status of persons having nondisabling orthopedic impairments with the employment status of the remaining

[23] As a matter of fact the death rates in 1940 (based on resident deaths) from all accidents was higher in the rural areas than in the larger cities (a rate of 72.4 per 100,000 population for the rural areas, as compared with a rate of 68.0 for cities of 100,000 population and over), and was about the same in the rural areas as for the total population of the United States (72.4 as against 73.6 for the respective populations). Allocated (resident) death rates due to accidents from motor vehicles in 1940 were 25.7, 23.8, and 26.2 for the rural, metropolitan, and total United States population, respectively. (See: Vital Statistics—Special Reports, Vol. 16, Nos. 41 and 42.) To be sure, death rates depend not only upon the number of diseases or injuries but also on their severity. Yet the given rates supply some indication on the existence of about identical conditions with respect to accidents in the rural and urban areas. It should be remembered in this connection that accidents are a major cause for orthopedic impairments, as shown later. With respect to the diseases responsible for orthopedic impairments, one would hardly consider rural life as less conducive to such causes.

[24] Employment status was determined as on the day of the visit.

[25] The reader must be referred to (*14*) for a detailed explanation of the terms used in the employment classification.

[26] The term "remaining" refers to the Survey population, exclusive of the blind, the deaf, and those having orthopedic impairments, hernia, or hemorrhoids.

TABLE 5.—*Employment status of persons with orthopedic impairments compared with the employment status of the remaining population, 1935–36*

Employment status and sex	Percent distribution by employment status, age groups 15–64											
	Persons with orthopedic impairments									Remaining population [1]		
	Incapacitating			Nondisabling			All impairments					
	15–24	25–44	45–64	15–24	25–44	45–64	15–24	25–44	45–64	15–24	25–44	45–64
Males												
Employed	5.1	8.5	4.5	36.4	69.1	59.9	33.8	65.2	53.5	38.2	82.8	76.4
On work relief	0.4	0.9	0.5	4.4	10.3	9.6	4.0	9.7	8.6	3.2	6.0	6.6
Seeking work	5.1	7.4	5.5	23.4	15.7	19.2	21.8	15.2	17.6	19.3	10.2	13.5
In school	12.4	(2)	(2)	30.6	(2)	(2)	29.1	(2)	(2)	38.2	(2)	(2)
Unemployable	7.7	65.3	84.9	0.5	3.6	7.6	1.1	7.5	16.5	0.1	0.4	1.1
Other [3]	69.3	17.9	4.6	4.7	1.3	3.7	10.2	2.4	3.8	1.0	0.6	2.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Females												
Employed	4.3	5.0	2.0	18.1	22.0	11.5	16.4	20.1	10.2	29.3	27.2	15.8
On work relief	-----	-----	-----	1.6	2.1	1.3	1.4	1.9	1.1	0.7	0.9	0.9
Seeking work	5.4	2.7	1.7	13.6	6.2	3.7	12.6	5.9	3.4	12.1	3.6	2.3
In school	12.0	(2)	(2)	29.5	(2)	(2)	27.3	(2)	(2)	30.1	(2)	(2)
Housewife	2.7	35.9	48.5	21.2	59.9	71.1	19.0	57.2	67.5	20.3	63.6	72.3
Unemployable	9.2	20.9	19.0	0.7	1.8	2.3	1.8	3.9	4.8	0.1	0.1	0.2
Other [3]	66.4	35.5	28.8	15.3	2.0	10.1	21.5	11.0	13.0	7.4	4.6	8.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] "Remaining population" refers to the total urban population of the Health Survey, exclusive of persons totally or partially blind, totally or partially deaf, and persons having orthopedic impairments, hernia, or hemorrhoids.
[2] These persons constitute a negligible proportion of the total age group; they are included in the classification "Other."
[3] "Other" applies mainly to persons "at home" and "retired." It also includes persons from other classifications (like "Housewives" among males, or "In school" for persons beyond age 25), in which these persons constitute a small percent of the total age group (see footnote 2).

population reveals similarly significant differences. Of these impaired persons aged 15–24, 36.4 percent were employed as compared with 38.2 percent in the remaining population; 69.1 percent of these persons aged 25–44 were employed as against 82.8 percent in the remaining population, and 59.9 percent of the handicapped persons aged 45–64 were employed as against 76.4 percent employed in the remaining population of the corresponding age.

The impairments interfere also with the employment status of the female population. Of course it is not as serious a problem since the employment of women in general, except in the younger age groups, is less common when no national emergencies exist. Of the incapacitated girls in the younger age group (aged 15–24), only 4.3 percent were employed and 12.0 percent were in school; of the girls having nondisabling impairments 18.1 percent were employed and 29.5 percent were in school, as compared with 29.5 percent employed and 30.1 percent in school of girls of the same age in the remaining population.

These employment restrictions apparently prevail in spite of constant occupational readjustments that undoubtedly take place among the handicapped persons—adjustments which tend to lessen unemployment within their ranks.

CAUSES OF IMPAIRMENTS

Little needs to be added to what is brought out clearly and in detail in table 6, as to causes of orthopedic impairments. Accidents are about on a par with disease in causing incapacitating impairments among males, and they are the predominant factor in causing nondisabling impairments. Of the incapacitating impairments among males, 43.0 percent were due to accidents, primarily occupational (23.6 percent), and automobile accidents (8.6 percent), and 53.7 percent were due to disease resulting principally from apoplexy and infantile paralysis (39.6 percent). Of the nondisabling impairments among males, 73.3 percent were caused by accidents, with occupational (44.5 percent) and home (13.2 percent) accidents as the leading causes. Infantile paralysis, congenital diseases, and diseases of infancy are the main contributors among the diseases.

TABLE 6.—*Distribution of persons with orthopedic impairments by cause of impairment, classified by disability and sex, 1935–36*

Cause	Males			Females		
	Percent distribution of persons having impairments					
	Incapacitating	Nondisabling	Total	Incapacitating	Nondisabling	Total
All impairments	100.0	100.0	100.0	100.0	100.0	100.0
Accidents	43.0	73.3	69.6	30.9	43.3	41.1
Occupational	23.6	44.5	42.0	2.4	5.1	4.6
Home	4.1	13.2	12.1	13.3	24.5	22.6
Public	5.5	8.6	8.2	7.2	7.6	7.5
Automobile	8.6	5.8	6.1	6.6	5.0	5.3
Unspecified	1.2	1.2	1.2	1.4	1.1	1.1
Disease	53.7	23.6	27.3	69.0	56.4	58.6
Apoplexy	34.7	3.3	6.9	42.9	7.4	13.2
Infantile paralysis	4.9	5.2	5.2	8.5	10.9	10.5
Congenital and infancy	4.0	4.1	4.1	5.8	8.7	8.2
Rheumatism	0.4	2.5	2.3	0.7	10.1	8.6
Tuberculosis	0.4	1.4	1.3	0.7	2.1	1.9
Weakness of arches	1.1	1.1	1.1	2.2	2.9	2.8
Local infection	0.2	0.9	0.8		1.6	1.4
Diabetes		0.4	0.4		0.9	0.7
Other, known and unknown diseases	8.0	4.7	5.2	8.2	11.8	11.3
Other causes	3.3	3.1	3.1	0.1	0.3	0.3
Wounds of war	2.8	2.7	2.7			
External causes	0.5	0.4	0.4	0.1	0.3	0.3

Among the females accidents play the minor part: 30.9 percent of the incapacitating impairments were due to accidents, mainly home accidents, and the remaining incapacitating impairments (69.0 percent) were caused by disease—again apoplexy and infantile paralysis being the principal causes. For nondisabling impairments among females, the responsibility is about equally divided between accident and disease: 43.3 percent were due to accidents, chiefly home accidents, and 56.4 percent were brought about by diseases including

those of congenital origin or of early infancy.[27] From these percentage distributions of impairments by cause (table 6) and the general estimates of persons with orthopedic impairments (tables 2 and 3), general estimates by cause can be readily obtained for the United States as a whole. Such estimates should prove of value in planning preventive measures or a rehabilitation program.

TYPES OF IMPAIRMENTS AND PARTS OF BODY AFFECTED

In like manner general knowledge about the type of the impairments is valuable. Two complementary tables are therefore presented (tables 7 and 8). Table 7 distinguishes broadly the impairments by (*a*) lost members, and (*b*) crippled or paralyzed members. Table 8 states for each of these groups the parts of the body affected.

Irrespective of age, the incapacitating impairments among males consist almost entirely of crippled or paralyzed members. It is especially true of the younger and the older age groups. Crippled and paralyzed members of the body constituted 95 percent of the incapacitating impairments among males under 15 years of age, and about 94 percent of these impairments among males aged 65 and over. The lowest percentage was found among the 25 to 44 age group (84 percent) followed by that of the 15 to 24 age group (86 percent). Lost members make up on the average about one-tenth of the incapacitating impairments. Nondisabling impairments are about equally divided between lost members and crippled and paralyzed members. No such differences obtain with respect to impairments among females: whether incapacitating or nondisabling, crippled and paralyzed members are the chief type of impairment. This does not mean, however, that the absolute incidence of impairment of crippled or paralyzed members is smaller among the males than among the females. This type of impairment among males is overweighted by the high incidence of lost members, due to occupational accidents.[28]

The parts of the body affected by the impairments are reported in table 8. Fingers or thumbs make up three-fourths of the lost members among males, and two-thirds of the lost members among females. Feet or legs are the chief component of crippled or paralyzed members.

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[27] For more details on home accidents as a cause of impairments, see (7).

[28] Total prevalence rates (per 1,000 population of all ages) of orthopedic impairments were 27.9 and 11.6 for males and females, respectively, based on the age distribution of 1940 United States population. Obviously, the total male prevalence rate is about 2.5 times as high as the corresponding female rate. Based on the population of the National Survey, the corresponding rates were 27.2 for males and 11.1 for females (table 9), apparently lower than the respective rates of the total United States. The differences in the total rates are due to the differences in the age distribution of the United States population and that of the Survey population. The Health Survey had a younger (urban) population.

TABLE 7.—*Distribution of persons with orthopedic impairments, by type of impairment and disability, classified by age and sex, 1935–36*

Type of impairment and disability	Percentage distribution for each age group					
	All ages	Under 15	15–24	25–44	45–64	65 and over
MALES						
Incapacitated						
Lost members	10.4	4.9	14.4	16.4	10.7	6.2
Crippled or paralyzed members	89.6	95.1	85.6	83.6	89.3	93.8
Not-disabled						
Lost members	53.3	17.7	39.4	56.5	60.4	49.1
Crippled or paralyzed members	46.7	82.3	60.6	43.5	39.6	50.9
All impaired [1]						
Lost members	46.7	15.5	36.5	52.8	52.7	37.5
Crippled or paralyzed members	53.3	84.5	63.5	47.2	47.3	62.5
FEMALES						
Incapacitated						
Lost members	3.5	2.3	3.9	3.8	4.5	2.7
Crippled or paralyzed members	96.5	97.7	96.1	96.2	95.5	97.3
Not-disabled						
Lost members	19.4	13.0	16.6	25.8	20.8	13.3
Crippled or paralyzed members	80.6	87.0	83.4	74.2	79.2	86.7
All impaired [1]						
Lost members	15.8	10.8	14.6	22.5	17.0	9.7
Crippled or paralyzed members	84.2	89.2	85.4	77.5	83.0	90.3

[1] "All impaired" refers to the total number of persons with orthopedic impairments, whether or not incapacitated.

TABLE 8.—*Distribution of persons with orthopedic impairments, by type of impairment and parts of body affected, classified by sex, 1935–36*

Type of impairment and parts of body affected	Percent distribution	
	Males	Females
All impairments	100.0	100.0
Lost members	46.7	15.8
Fingers or thumb	34.4	10.6
Foot or leg	5.6	2.4
Hand or arm	3.3	1.2
Toes	2.9	1.3
Two or more major members	0.6	0.3
Crippled or paralyzed members	53.3	84.2
Foot or leg	19.6	32.9
Two major members	7.2	13.6
Hand or arm	7.1	8.5
Fingers or thumb	5.0	4.0
Three major members	4.4	9.5
Spine or back	3.9	6.3
Entire body	3.4	6.6
Other trunk	2.2	2.3
Toes	0.4	0.5

RACIAL AND ECONOMIC FACTORS

As revealed by the data (table 9), there are differences in the incidence of orthopedic impairments among white and colored groups.[29] The prevalence rates of incapacitating impairments are on the whole higher among the colored than among the white groups, for both males and females alike. The table shows a rate of 2.94 incapacitating impairments among white males, as against 3.95 among colored males,

[29] "Colored" refers essentially to Negroes, since the latter constituted 95 percent of all "Colored" surveyed by the Health Survey (*14*).

TABLE 9.—*Prevalence of orthopedic impairments among the white and colored urban population, classified by age and sex, 1935–36*

Age and nature of impairment	Number of cases per 1,000 persons					
	Males			Females		
	Total	White	Colored	Total	White	Colored
Incapacitating impairments						
Under 15	0.79	0.80	0.72	0.71	0.77	0.31
15–24	1.15	1.09	1.71	0.78	0.78	0.80
25–44	1.82	1.72	2.67	0.94	0.85	1.57
45–64	5.58	5.25	9.30	2.64	2.41	5.36
65 and over	17.82	17.00	30.93	10.50	10.22	14.78
All ages	3.04	2.94	3.95	1.76	1.71	2.11
Nondisabling impairments						
Under 15	4.94	5.05	4.11	3.44	3.55	2.58
15–24	12.20	12.37	10.49	5.64	5.68	5.29
25–44	26.36	26.60	24.25	7.56	7.52	7.85
45–64	42.90	42.73	44.91	14.85	14.44	19.70
65 and over	71.01	70.68	76.27	34.82	34.57	38.71
All ages	24.18	24.49	21.20	9.30	9.35	8.80
All impairments [1]						
Under 15	5.73	5.85	4.83	4.15	4.32	2.89
15–24	13.35	13.46	12.20	6.42	6.46	6.09
25–44	28.18	28.32	26.92	8.50	8.38	9.42
45–64	48.48	47.98	54.21	17.49	16.85	25.06
65 and over	88.83	87.68	107.20	45.32	44.79	53.49
All ages	27.22	27.44	25.15	11.06	11.07	10.91

[1] "All impairments" refers to incapacitating and nondisabling cases.

and a rate of 1.71 among white females as against 2.11 among colored females. However, there is no intention to imply that these differences are due to some racial (genetic) factors. It might be presumed that the low economic status of this group, which involves bad housing, more hazardous occupations, inadequate medical care for mothers, and poor nutrition in general, is more likely to be accountable for the higher incidence of these impairments. The existence of wide differences in the incidence of impairments among various income groups of the white population, as shown later, seems to bear out such a presumption.

With respect to nondisabling impairments, the colored have lower prevalence rates than the white groups. It is quite possible that the differences are "real" due to occupational differentials prevailing between these groups. It seems, however, more probable that the informants of the colored group might have been less aware of the nondisabling impairments, as long as these were not interfering with the person's occupation or activity. For want of better information on the "colored," these data, though inadequate, fill an undesirable gap in the setting of the problem.

Reference was made previously to the differences in the prevalence rates of impairments among the various income groups. The different rates are presented in table 10 and figure 4, for three income groups.[30]

[30] The income classification was made on the basis of annual family income. Reference must be made here to (*14*) or (*28*) for details concerning the meaning of these terms.

TABLE 10.—*Prevalence of orthopedic impairments among the white male and female urban population in the various income classes, 1935–36*

Age and nature of impairment	Number of cases per 1,000 persons in various income classes [1]					
	Males			Females		
	Under $1,000	$1,000–$1,999	$2,000 and over	Under $1,000	$1,000–$1,999	$2,000 and over
Incapacitating impairments						
Under 15	1.02	0.75	0.41	0.86	0.77	0.62
15–24	1.55	0.98	0.68	1.02	0.81	0.47
25–44	3.65	0.99	0.66	1.40	0.56	0.84
45–64	10.26	3.46	1.85	3.46	2.16	1.56
65 and over	24.46	13.32	9.22	11.82	9.92	9.39
All ages	5.18	1.95	1.34	2.40	1.44	1.37
Nondisabling impairments						
Under 15	6.36	4.06	3.92	4.24	3.02	2.96
15–24	15.62	11.15	8.97	7.44	5.00	3.44
25–44	40.25	22.37	15.61	11.51	5.90	4.82
45–64	62.17	37.07	24.49	21.61	11.31	8.24
65 and over	92.35	56.08	42.60	42.82	27.01	24.49
All ages	33.76	20.37	15.68	13.22	7.18	6.09
All impairments						
Under 15	7.38	4.81	4.33	5.10	3.79	3.58
15–24	17.17	12.13	9.65	8.46	5.81	3.91
25–44	43.90	23.36	16.27	12.91	6.46	5.66
45–64	72.43	40.53	26.34	25.07	13.47	9.80
65 and over	116.81	69.40	51.82	54.64	36.93	33.88
All ages	38.94	22.32	17.02	15.62	8.62	7.46

[1] Classification by income is based on annual family income.

One may easily note the sharp increase in the prevalence rates of incapacitating as well as nondisabling impairments in proceeding from the higher to the lower income classes. For males, the rates of incapacitating impairments range from 1.34 for the group with $2,000 or more annual income to 5.18 for the under $1,000 income class, while the rates for the nondisabling impairments range from 15.68 to 33.76 for these income classes respectively. These differences by income are obviously much larger for the incapacitating than for the nondisabling impairments. For females the rates for incapacitating impairments range from 1.37 to 2.40 and for the nondisabling impairments the rates range from 6.09 to 13.22 within the two extreme income classes.

Differences by income, analogous to those found in the incidence of orthopedic impairments, were found in the incidence of deafness (*5*) and blindness (*6*). If one remembers that the bulk of the population belongs to the lower income classes,[31] then the problem of physically handicapped persons presents itself in its full vastness and seriousness.[32]

[31] See tables 1 and 19 (*14*) on the distribution of the population by income. Of course, the impairments in themselves could be responsible for lowering the income. Whatever the cause and effect relationship might be, the fact still remains that the higher prevalence of impairments is among the lower income groups.

[32] See Lynch (*22*) on a general discussion of the employment of the physically handicapped persons, Reznikoff (*30*) on the emotional factors involved in the problem of rehabilitation of such persons, and Bartle (*4*) on the employment and placement of such persons in industry. Of course, Kessler's book (*15*) has the widest approach to this problem, even if the statistics that were available to the author were far from being adequate.

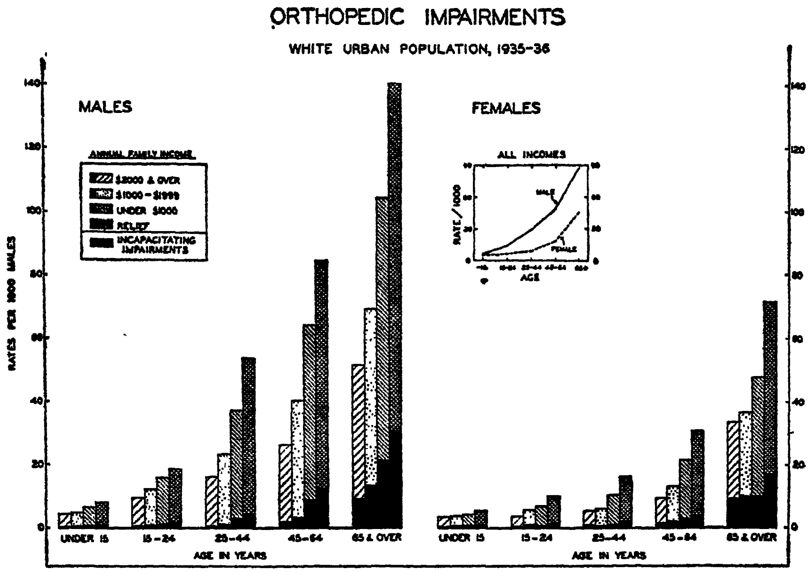

FIGURE 4.—Prevalence rates of incapacitating and nondisabling impairments among the various income classes of the urban population of the United States, 1935-36, by sex and age. (Based on table 10.)

II.

It was thought desirable, for the sake of a unified picture on the physically handicapped persons, to present combined estimates on the number of persons in the United States that might be found either deaf or blind or having orthopedic impairments.[33] Prevalence rates were, therefore, recomputed for the deaf and the blind based on 5-year age distributions of these defects.[34]

Like the original prevalence rates of the orthopedic impairments, the original quinquennial rates of deafness and blindness were smoothed by applying to them 5-point least square moving averages. The prevalence rates of deafness, blindness, and orthopedic impairments were then combined into two groups: major and minor impairments. The major impairments include (*a*) incapacitating impairments, (*b*) total deafness, and (*c*) blindness in both eyes. The minor impairments comprise (*a*) nondisabling impairments, (*b*) partial deafness, and (*c*) blindness in one eye. The combined prevalence rates, by sex, are plotted in figure 5.

Estimates for the United States population as of 1940, based on these separate prevalence rates, are presented in table 11. The estimates are 356,400 males with major impairments and 2,834,000 with minor impairments; 267,100 females with major impairments, and

[33] For detailed analyses, see Beasley (*5*) on deafness and Britten (*6*) on blindness.
[34] The prevalence rates given in the mentioned studies (*5*) and (*6*) are by wider age intervals.

PREVALENCE OF MAJOR AND MINOR IMPAIRMENTS AT SPECIFIC AGES IN THE URBAN POPULATION

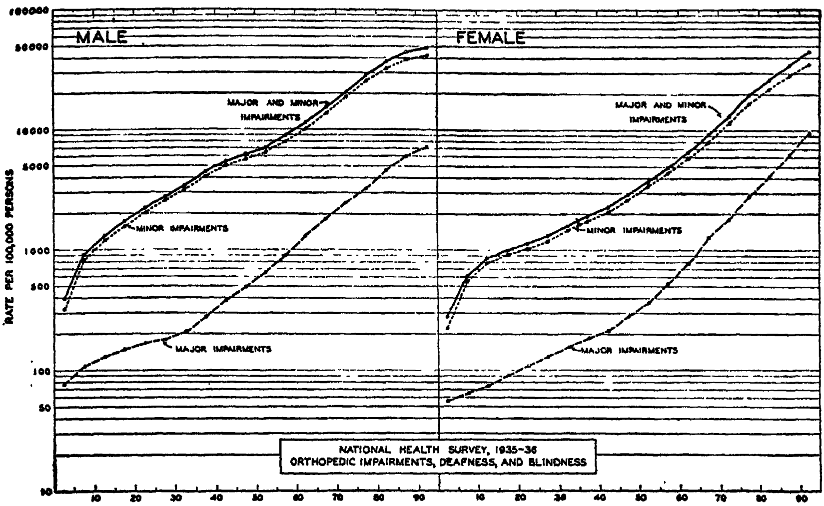

FIGURE 5.—Prevalence rates of major and minor impairments among the urban population in the United States, 1935-36, by age and sex. (Major impairments include incapacitating orthopedic impairments, total deafness, and blindness in both eyes; minor impairments include nondisabling orthopedic impairments, partial deafness, and blindness in one eye.)

1,540,300 with minor impairments. The total estimated number of persons (i. e., both sexes) with major impairments is 623,500, and the number with minor impairments is 4,374,300. These estimates thus reach a total of 5 million persons having either major or minor impairments, even when the defects are limited to orthopedic impairments, deafness, and blindness.

The figures presented here should be regarded only as workable estimates which, no doubt, are being considerably altered by the war economy and by the war itself.

TABLE 11.—*Estimated number of persons with major or minor physical impairments among the male and female population of the United States as of 1940* [1]

Nature of impairment	Estimated number of persons by age groups, in 1,000's						
	All ages	Under 15	15-24	25-34	35-44	45-64	65 and over
MALES							
Major and minor impairments							
Incapacitating and nondisabling orthopedic impairments	1,844.6	92.9	158.9	236.4	309.3	670.6	376.5
Total or partial deafness	963.3	33.8	47.2	53.0	90.4	275.8	463.1
Blindness in one or both eyes	382.5	17.7	26.6	32.8	48.5	125.7	131.2
Total	3,190.4	144.4	232.7	322.2	448.2	1,072.1	970.8
Major impairments							
Incapacitating orthopedic impairments	208.5	13.2	13.3	14.2	21.4	76.5	69.9
Total deafness	77.1	10.9	10.0	9.6	9.3	16.9	20.4
Blindness in both eyes	70.8	2.5	3.3	4.1	5.8	22.5	32.6
Total	356.4	26.6	26.6	27.9	36.5	115.9	122.9

[1] Based on data from the National Health Survey, 1935-36.

TABLE 11.—*Estimated number of persons with major or minor physical impairments among the male and female population of the United States as of 1940*—Con.

Nature of impairment	Estimated number of persons by age groups, in 1,000's						
	All ages	Under 15	15-24	25-34	35-44	45-64	65 and over
Minor impairments							
Nondisabling orthopedic impairments	1,636.1	79.7	145.6	222.2	287.9	594.1	306.6
Partial deafness	886.2	22.9	37.2	43.4	81.1	258.9	442.7
Blindness in one eye	311.7	15.2	23.3	28.7	42.7	103.2	98.6
Total	2,834.0	117.8	206.1	294.3	411.7	956.2	847.9
FEMALES							
Major and minor impairments							
Incapacitating and nondisabling orthopedic impairments	759.0	66.0	81.0	87.9	86.9	224.4	212.8
Total or partial deafness	833.8	26.6	37.2	57.6	85.9	253.9	372.6
Blindness in one or both eyes	214.6	9.5	11.6	14.1	18.2	59.5	101.7
Total	1,807.4	98.4	129.8	159.6	191.0	537.8	687.1
Major impairments							
Incapacitating orthopedic impairments	132.5	12.5	12.3	12.5	11.6	34.1	49.5
Total deafness	70.9	6.9	8.2	8.5	7.8	17.1	22.4
Blindness in both eyes	63.7	1.5	2.1	2.9	4.0	15.3	37.9
Total	267.1	17.2	22.6	23.9	23.4	66.5	109.8
Minor impairments							
Nondisabling orthopedic impairments	626.5	53.5	68.7	75.4	75.3	190.3	163.3
Partial deafness	762.9	19.7	29.0	49.1	78.1	236.8	350.2
Blindness in one eye	150.9	8.0	9.5	11.2	14.2	44.2	63.8
Total	1,540.3	81.2	107.2	135.7	167.6	471.3	577.3

III. APPENDIX

TABLE 1.—*Distribution of the urban population of the National Health Survey, and the cases of orthopedic impairments, by sex and age, 1935–36*

Age	Population [1]		Orthopedic impairments (number of cases)			
			Incapacitating		Nondisabling	
	Males	Females	Males	Females	Males	Females
Under 5	89,323	86,369	51	42	215	142
5-9	101,924	100,815	92	88	497	339
10-14	112,075	112,412	96	84	787	549
15-19	105,432	116,773	112	92	999	598
20-24	101,336	123,096	125	94	1,523	754
25-29	102,295	122,125	126	82	1,977	825
30-34	94,690	106,537	137	90	2,160	773
35-39	98,387	108,494	186	105	2,831	827
40-44	93,063	96,141	258	129	3,258	848
45-49	82,959	83,131	313	122	3,041	877
50-54	68,841	68,624	321	175	2,873	932
55-59	49,270	51,770	329	153	2,263	879
60-64	38,530	43,538	371	201	2,085	974
65-69	28,456	33,257	411	227	1,856	895
70-74	18,193	22,598	346	246	1,332	793
75-79	10,764	13,492	237	165	847	592
80-84	4,383	6,329	96	121	345	303
85-89	1,490	2,401	30	49	115	126
90 and over	433	798	14	19	24	34
Unknown	1,079	2,481				
Total	1,202,923	1,301,181	3,651	2,284	29,028	12,060

[1] Taken from a tabulation by the Social Security Board. From these data and the distribution of the orthopedic cases, quinquennial prevalence rates were computed by relating the cases of each age to the corresponding population. The original rates were then smoothed by means of 5-point moving least square averages. The smoothed rates are given in table 1.

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DEATHS DURING WEEK ENDED OCTOBER 9, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 9, 1943	Corresponding week, 1942
Data for 87 large cities of the United States:		
Total deaths	8,044	8,517
Average for 3 prior years	7,915	
Total deaths, first 40 weeks of year	352,576	325,568
Deaths under 1 year of age	582	622
Average for 3 prior years	553	
Deaths under 1 year of age, first 40 weeks of year	25,267	22,274
Data from industrial insurance companies:		
Policies in force	65,900,899	65,108,967
Number of death claims	10,543	10,802
Death claims per 1,000 policies in force, annual rate	8.3	8.7
Death claims per 1,000 policies, first 40 weeks of year, annual rate	9.7	9.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 16, 1943

Summary

A total of 484 cases of poliomyelitis was reported for the current week (exclusive of delayed reports of 11 cases), as compared with 515 for the preceding week and 679 for the next earlier week. The cumulative total to date (first 41 weeks of the year) is 10,319, more than 11 percent above the total for the corresponding period of any year since 1931, when 13,615 cases were reported for the same period. States reporting 12 or more cases for the current week (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 19 (10), Rhode Island 12 (5), Connecticut 16 (10), Michigan 24 (16), Iowa 18 (17), Kansas 31 (23), Texas 21 (15), California 76 (49); *decreases*—New York 35 (52), Illinois 57 (91), Wisconsin 12 (14), Washington 28 (30), Oregon 32 (33); *no change*—Colorado 15 (15).

The incidence of meningococcus meningitis increased sharply, 240 cases being reported for the week, as compared with 191 last week and 192 and 178, respectively, for the next earlier weeks. The 5-year median is 34. States reporting 6 or more cases (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 15 (14), Pennsylvania 20 (11), Ohio 20 (5), Illinois 20 (17), Michigan 19 (11), Missouri 7 (6), Maryland 9 (3), Tennessee 7 (2), and California 17 (6); *decreases*—New York 28 (29), New Jersey 9 (14), Texas 6 (7); *no change*—Virginia 7 (7). The cumulative total for the first 41 weeks of the year is 14,954, more than 50 percent above the total reported for any entire year since the collection of these data was begun. In some of the earlier years, however, fewer States were reported.

Of other diseases included in the following table, the incidence of only measles, scarlet fever, tularemia, and typhus fever is currently above respective figures for the corresponding week last year.

Deaths recorded for the week in 88 large cities of the United States totaled 8,560, as compared with 8,253 last week and a 3-year (1940–42) average of 7,854. The cumulative figure for the first 41 weeks of the year is 369,911, as compared with 341,798 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended October 16, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Oct. 16, 1943	Oct. 17, 1942		Oct. 16, 1943	Oct. 17, 1942		Oct. 16, 1943	Oct. 17, 1942		Oct. 16, 1943	Oct. 17, 1942	
NEW ENGLAND												
Maine	1	0	1	------	------	------	60	2	4	2	1	0
New Hampshire	0	0	0	------	------	------	4	36	1	1	0	0
Vermont	0	1	0	------	------	------	15	16	5	0	1	0
Massachusetts	5	3	2	------	------	------	74	107	57	15	2	2
Rhode Island	0	2	0	------	------	------	18	4	4	3	2	0
Connecticut	1	2	1	2	6	6	9	3	9	2	1	0
MIDDLE ATLANTIC												
New York	7	18	17	[1] 5	[1] 6	[1] 6	108	66	68	28	5	3
New Jersey	4	1	10	5	11	12	80	19	19	9	3	1
Pennsylvania	15	8	16	1	------	------	59	67	67	20	8	3
EAST NORTH CENTRAL												
Ohio	12	18	18	------	15	9	107	19	19	20	0	1
Indiana	9	8	11	5	13	6	49	12	11	4	0	1
Illinois	14	20	20	9	7	6	39	11	13	20	7	1
Michigan [2]	20	12	10	1	1	1	246	23	36	19	2	2
Wisconsin	3	3	1	17	33	27	195	53	53	4	1	1
WEST NORTH CENTRAL												
Minnesota	8	5	4	------	------	2	183	7	7	0	0	0
Iowa	4	1	3	------	------	------	8	11	11	1	0	0
Missouri	8	4	7	3	1	1	5	14	14	7	0	0
North Dakota	0	1	2	4	5	5	259	0	4	0	0	0
South Dakota	2	17	2	------	------	------	4	5	5	0	0	0
Nebraska	11	1	1	2	7	1	8	15	4	1	0	0
Kansas	1	6	5	2	5	3	5	6	6	0	1	1
SOUTH ATLANTIC												
Delaware	0	1	1	------	------	------	1	0	2	2	1	0
Maryland [2]	3	7	7	2	8	7	7	4	6	9	0	0
District of Columbia	0	0	2	------	------	------	1	1	2	1	2	0
Virginia	11	30	37	129	169	106	37	5	11	7	1	1
West Virginia	20	11	11	------	1	9	10	2	2	5	1	0
North Carolina	31	78	78	1	1	------	15	2	32	5	0	0
South Carolina	25	37	37	133	263	210	4	6	3	2	0	0
Georgia	25	39	45	13	38	16	13	4	4	3	0	0
Florida	8	10	8	11	1	1	6	1	1	3	0	0
EAST SOUTH CENTRAL												
Kentucky	13	24	20	------	5	3	19	1	7	5	2	2
Tennessee	10	23	23	11	12	8	6	11	11	7	0	1
Alabama	32	40	30	38	55	23	11	3	4	1	1	1
Mississippi [2]	17	16	17	------	------	------	------	------	------	3	0	0
WEST SOUTH CENTRAL												
Arkansas	6	17	17	17	16	14	6	5	5	0	1	1
Louisiana	7	14	14	4	3	3	1	0	1	1	0	1
Oklahoma	4	10	14	23	25	38	3	1	1	0	0	0
Texas	33	78	43	723	507	195	25	33	15	6	2	2
MOUNTAIN												
Montana	3	4	3	5	3	3	52	5	17	0	0	0
Idaho	0	0	0	------	3	3	0	14	7	0	0	0
Wyoming	0	0	0	3	8	------	6	7	4	1	0	0
Colorado	2	8	9	21	25	25	39	3	6	0	0	0
New Mexico	0	6	0	------	1	------	0	0	3	0	0	0
Arizona	10	1	1	63	47	47	13	13	13	1	0	0
Utah [2]	0	0	0	------	1	1	3	108	7	0	0	0
Nevada	0	0	------	2	1	------	0	1	------	0	0	------
PACIFIC												
Washington	8	1	0	------	3	------	9	157	18	2	1	0
Oregon	1	3	3	6	8	8	11	59	10	3	1	1
California	26	24	16	29	32	16	43	38	57	17	2	0
Total	415	613	613	1,290	1,348	769	1,876	980	980	240	49	34
41 weeks	9,865	10,537	11,215	88,361	87,214	155,313	546,291	471,849	471,849	14,954	2,782	1,645

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 16, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Oct. 16, 1943	Oct. 17, 1942		Oct. 16, 1943	Oct. 17, 1942		Oct. 16, 1943	Oct. 17, 1942		Oct. 16, 1943	Oct. 17, 1942	
NEW ENGLAND												
Maine	0	4	1	16	6	6	0	0	0	2	0	2
New Hampshire	1	0	0	1	5	2	0	0	0	0	2	0
Vermont	4	0	0	6	8	7	0	0	0	1	0	0
Massachusetts	19	2	3	141	128	60	0	0	0	3	12	0
Rhode Island	12	0	0	4	2	3	0	0	0	0	1	0
Connecticut	16	4	4	24	18	18	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York	35	20	20	183	152	121	0	0	0	11	12	14
New Jersey	6	14	9	35	43	43	0	0	0	0	1	4
Pennsylvania	9	7	13	110	112	112	0	0	0	5	6	14
EAST NORTH CENTRAL												
Ohio	7	6	6	189	137	137	0	0	0	5	7	7
Indiana	1	5	5	57	50	50	0	1	2	5	2	3
Illinois	57	22	22	129	145	145	3	0	0	2	22	17
Michigan [2]	24	6	31	75	72	80	1	0	0	3	4	4
Wisconsin	12	2	5	110	109	80	0	0	0	0	2	1
WEST NORTH CENTRAL												
Minnesota	7	2	19	68	49	53	0	0	0	1	0	0
Iowa	18	8	8	72	45	33	0	2	1	1	0	2
Missouri	4	1	1	35	44	44	0	0	0	3	3	10
North Dakota	1	1	0	6	1	12	0	0	0	0	0	0
South Dakota	0	1	1	13	19	13	0	0	0	0	0	0
Nebraska	6	15	2	24	25	8	2	0	0	0	0	1
Kansas	31	11	6	62	70	62	0	0	0	1	1	2
SOUTH ATLANTIC												
Delaware	0	2	0	4	10	8	0	0	0	0	1	1
Maryland [2]	2	0	0	24	26	26	0	0	0	5	1	5
District of Columbia	0	0	0	17	15	10	0	0	0	0	2	2
Virginia	5	3	3	34	57	39	0	0	0	9	13	10
West Virginia	0	1	2	84	42	42	0	5	0	9	3	5
North Carolina	1	2	2	138	113	82	0	1	0	6	3	9
South Carolina	0	2	2	15	12	13	0	0	0	2	3	5
Georgia	1	1	1	40	58	42	0	0	0	3	3	8
Florida	0	0	1	9	3	6	0	0	0	1	1	1
EAST SOUTH CENTRAL												
Kentucky	4	1	6	63	65	62	0	1	0	5	3	15
Tennessee	0	5	3	57	98	52	1	0	0	4	6	12
Alabama	1	5	3	21	40	32	0	0	0	1	6	3
Mississippi [2]	1	1	1	19	12	17	1	0	0	1	2	4
WEST SOUTH CENTRAL												
Arkansas	0	3	1	7	23	15	0	3	1	0	7	9
Louisiana	1	3	3	10	12	12	0	0	0	3	7	8
Oklahoma	[3] 11	0	2	17	23	23	0	0	1	11	5	5
Texas	21	12	5	32	33	32	0	0	0	9	16	17
MOUNTAIN												
Montana	0	1	0	19	8	12	1	0	0	0	0	1
Idaho	0	0	0	17	0	12	0	1	0	0	0	0
Wyoming	3	0	1	3	1	4	0	0	0	1	1	1
Colorado	[3] 15	1	1	25	18	18	0	0	0	1	1	4
New Mexico	0	0	0	5	2	8	0	0	0	1	8	3
Arizona	0	1	1	7	3	3	0	0	0	2	1	1
Utah [2]	10	0	2	10	20	8	0	0	0	0	0	0
Nevada	2	0	------	2	0	------	0	0	------	0	0	------
PACIFIC												
Washington	28	1	1	53	16	28	0	0	0	1	3	3
Oregon	32	0	1	31	4	7	0	0	0	1	0	1
California	76	14	10	133	87	87	0	0	0	3	7	7
Total	[3] 484	190	374	2,256	2,041	1,981	9	14	11	122	176	283
41 weeks	10,319	3,214	5,664	108,609	98,478	126,278	644	658	2,046	4,618	5,689	7,929

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 16, 1943, and comparison with corresponding week of 1942, and 5-year median—Con.

Division and State	Whooping cough			Week ended Oct. 16, 1943								
	Week ended—		Median 1938-42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Oct. 16, 1943	Oct. 17, 1942			Amebic	Bacillary	Unspecified					
NEW ENG.												
Maine	18	8	8	0	0	0	0	0	0	0	0	0
New Hampshire	0	8	0	0	0	0	0	0	0	0	0	0
Vermont	8	28	19	0	0	0	0	0	0	0	0	0
Massachusetts	61	161	99	0	0	3	0	0	0	0	1	1
Rhode Island	41	22	19	0	0	0	0	0	0	0	0	0
Connecticut	22	65	65	0	0	13	0	0	0	0	0	0
MID. ATL.												
New York	207	352	297	0	2	10	0	3	1	0	0	2
New Jersey	92	202	89	0	1	0	0	0	0	0	0	0
Pennsylvania	171	260	239	1	0	0	0	0	0	0	0	0
E. NO. CEN.												
Ohio	159	139	176	0	0	7	0	0	0	0	0	0
Indiana	12	49	25	0	0	0	0	0	0	1	0	0
Illinois	150	173	176	0	3	9	0	1	0	0	0	0
Michigan [2]	167	210	210	0	0	13	0	0	0	0	0	0
Wisconsin	151	137	139	0	0	0	0	0	0	0	0	0
W. NO. CEN.												
Minnesota	48	41	41	0	0	0	0	0	0	0	0	0
Iowa	40	11	12	0	1	0	0	0	0	0	0	0
Missouri	20	16	16	0	0	0	1	0	0	0	0	0
North Dakota	35	11	13	0	0	0	0	1	0	0	0	0
South Dakota	12	4	4	0	0	0	0	0	0	0	0	0
Nebraska	16	22	5	0	0	0	0	0	0	0	0	0
Kansas	36	22	22	0	1	1	0	0	0	0	1	0
SO. ATL.												
Delaware	0	2	3	0	0	0	0	0	0	0	0	0
Maryland [2]	49	62	36	0	0	0	5	0	0	0	0	0
Dist. of Col.	9	0	16	0	0	0	0	0	0	0	0	0
Virginia	59	29	29	0	0	0	82	0	0	0	2	1
West Virginia	11	1	17	0	0	0	0	0	0	0	0	0
North Carolina	150	42	65	0	0	0	0	0	0	0	0	0
South Carolina	25	14	19	0	0	3	0	0	0	0	0	20
Georgia	17	14	10	0	0	1	0	0	0	0	1	48
Florida	23	5	5	0	5	1	3	0	0	0	0	6
E. SO. CEN.												
Kentucky	54	9	37	0	0	6	0	0	0	0	0	0
Tennessee	52	34	32	0	1	0	5	0	0	0	0	6
Alabama	6	15	15	0	0	0	0	0	0	0	0	18
Mississippi [2]	-------	-------	-------	0	0	0	0	0	0	0	1	4
W. SO. CEN.												
Arkansas	9	26	18	0	1	5	0	0	0	0	1	0
Louisiana	1	0	3	0	2	0	0	0	0	0	0	10
Oklahoma	1	3	3	0	0	0	0	0	0	0	0	0
Texas	96	124	52	0	14	180	0	0	0	0	0	34
MOUNTAIN												
Montana	18	53	8	0	0	1	0	0	0	0	3	0
Idaho	0	0	2	0	0	0	0	0	0	0	0	0
Wyoming	8	10	2	0	0	0	0	0	0	0	0	0
Colorado	37	6	19	0	0	0	0	0	0	0	0	0
New Mexico	21	5	7	0	0	3	2	0	0	0	0	0
Arizona	8	1	7	0	0	0	9	0	0	0	0	0
Utah [2]	22	16	16	0	0	0	0	0	0	0	1	0
Nevada	0	0	-------	0	0	1	0	0	0	0	0	0
PACIFIC												
Washington	67	15	15	0	0	0	0	0	0	0	0	0
Oregon	26	12	12	0	0	0	0	0	0	0	0	0
California	122	175	175	0	1	12	0	1	0	0	0	0
Total	2,357	2,614	2,600	1	32	269	107	6	1	1	11	150
41 weeks	152,322	144,350	145,873	51	1,707	13,406	3,457	569	22	421	673	3,349
41 weeks, 1942	-------	-------	-------	68	945	10,348	5,705	457	38	440	739	2,779

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Exclusive of delayed reports (included only in cumulative total) as follows: Oklahoma, 5 cases; Colorado, 6 cases.
[4] Including paratyphoid fever cases reported separately as follows: Massachusetts, 3; Michigan, 1; Florida 1; Texas, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 2, 1943

This table lists the reports from 83 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	1	0	0	1	6	0	0	2
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	0	0	------	0	2	2	9	4	41	0	0	24
Fall River	0	0	------	0	1	2	0	0	4	0	0	5
Springfield	0	0	------	0	2	0	0	0	11	0	0	2
Worcester	0	0	------	0	1	0	6	0	28	0	0	3
Rhode Island:												
Providence	0	0	------	0	16	1	1	11	1	0	0	123
Connecticut:												
Bridgeport	0	0	------	0	1	0	0	1	0	0	0	0
Hartford	0	0	------	0	0	1	1	0	0	0	0	2
New Haven	0	0	------	0	1	0	0	0	1	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	3	3	3	5	5	0	1	7
New York	11	4	4	0	32	19	44	30	58	0	9	73
Rochester	0	0	------	0	0	1	4	0	1	0	1	7
Syracuse	0	0	------	0	0	2	2	1	0	0	1	24
New Jersey:												
Camden	0	0	------	0	0	0	1	0	0	0	0	1
Newark	2	0	------	0	0	2	2	0	1	0	0	18
Trenton	0	0	1	0	0	0	1	0	2	0	1	3
Pennsylvania:												
Philadelphia	5	0	1	0	2	4	14	1	14	0	0	41
Pittsburgh	2	0	1	1	13	2	13	2	20	0	1	20
Reading	0	0	------	0	0	0	0	0	2	0	0	4
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	0	4	0	0	3	16	0	0	7
Cleveland	0	0	2	1	4	6	7	0	30	0	2	23
Columbus	0	0	------	0	0	0	2	0	11	0	0	12
Indiana:												
Fort Wayne	0	2	------	0	0	0	2	0	0	0	0	0
Indianapolis	1	0	------	2	0	0	12	0	13	0	1	18
South Bend	0	0	------	0	2	0	0	0	1	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	7	0	------	0	10	6	28	51	21	0	0	54
Springfield	0	0	------	0	0	1	0	0	4	0	0	1
Michigan:												
Detroit	1	0	------	1	12	4	9	4	26	0	3	23
Flint	0	0	------	0	0	1	0	0	6	0	0	8
Grand Rapids	0	0	------	0	1	0	0	1	0	0	0	6
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	1	0	0	0
Milwaukee	0	0	------	0	6	1	4	2	24	0	0	71
Racine	0	0	------	0	1	0	0	0	1	0	0	15
Superior	1	0	------	0	23	0	0	0	0	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Minneapolis	3	0	------	2	7	3	4	4	11	0	0	7
St. Paul	2	0	------	0	8	0	1	0	5	0	0	15
Missouri:												
St. Joseph	0	0	------	0	0	1	0	0	11	0	0	0
St. Louis	1	0	1	0	3	1	3	3	6	0	0	10

City reports for week ended October 2, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Nebraska:												
Omaha	0	0		0	3	0	0	4	3	0	0	1
Kansas:												
Wichita	0	0		0	0	0	3	3	2	0	0	3
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0		0	6	2	0	0	1	0	0	5
Maryland:												
Baltimore	2	0	2	2	1	3	9	1	6	0	1	57
Cumberland	0	0		0	0	0	1	0	0	0	0	0
Frederick	0	0		0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0		0	1	2	6	1	10	0	1	9
Virginia:												
Lynchburg	0	0		0	11	0	1	0	2	0	0	20
Richmond	0	0		0	1	1	0	1	7	0	0	4
Roanoke	0	0		0	0	0	3	0	2	0	0	1
West Virginia:												
Charleston	0	0		0	1	0	0	0	1	0	0	6
Wheeling	0	0		0	0	0	1	0	0	0	0	6
North Carolina:												
Winston-Salem	0	0		0	0	0	2	0	2	0	0	7
South Carolina:												
Charleston	0	0		1	0	0	1	0	0	0	0	[illegible]
Georgia:												
Atlanta	1	0	6	0	0	0	1	0	2	0	0	[illegible]
Brunswick	0	0		0	0	0	0	0	1	0	0	[illegible]
Savannah	0	0		0	0	0	2	0	0	0	0	[illegible]
Florida:												
Tampa	2	0		0	0	0	0	0	0	0	0	[illegible]
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0		0	0	0	3	0	3	0	2	8
Nashville	1	0		0	0	0	2	0	1	0	0	1
Alabama:												
Birmingham	0	0	1	0	0	0	4	1	4	0	1	0
Mobile	1	0		0	0	0	1	0	1	0	1	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0		0	0	0	1	0	0	0	0	3
Louisiana:												
New Orleans	1	0		1	1	2	6	1	2	0	0	8
Shreveport	0	0		0	0	0	2	0	0	0	1	0
Texas:												
Dallas	1	0		0	0	0	2	2	1	0	0	5
Galveston	0	0		0	0	0	1	0	0	0	0	0
Houston	4	0		0	0	0	2	4	0	0	0	[illegible]
San Antonio	2	0	1	1	0	0	5	1	1	0	0	4
MOUNTAIN												
Montana:												
Billings	0	0		0	1	0	0	0	0	0	0	1
Helena	0	0		0	0	0	0	0	2	0	0	0
Missoula	0	0		0	0	0	0	0	1	0	0	0
Idaho:												
Boise	0	0		0	0	0	0	0	0	0	0	0
Colorado:												
Denver	3	0	4	1	2	2	1	5	2	0	0	21
Pueblo	0	0		0	3	0	0	1	3	0	0	0
Utah:												
Salt Lake City	0	0		0	1	0	0	5	4	0	0	2

City reports for week ended October 2, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	0	0	------	0	2	1	2	4	3	0	0	14
Spokane	0	0	1	0	7	0	3	0	2	0	0	6
Tacoma	1	0	------	0	0	0	1	3	3	0	0	20
California:												
Los Angeles	1	0	2	0	18	7	3	11	16	0	0	5
Sacramento	0	0	------	0	1	0	2	4	1	0	0	4
San Francisco	1	0	1	0	14	1	8	6	9	0	0	14
Total	58	6	28	13	235	84	252	182	480	0	27	857
Corresponding week, 1942	72	4	52	20	150	18	252	48	399	0	27	892
Average, 1938–42	81	------	53	[1] 11	[2] 173	------	[1] 248	------	360	1	43	1,065

Anthrax.—Cases: Philadelphia, 1.

Dysentery, amebic.—Cases: Boston, 5; New York, 1; Rochester, 1.

Dysentery, bacillary.—Cases: Buffalo, 18; New York, 8; Rochester, 1; Syracuse, 2; Chicago, 3; St. Louis, 5; Baltimore, 5; Richmond, 1; Charleston, S. C., 9; Atlanta, 1; Nashville, 2; Los Angeles, 5.

Dysentery, unspecified.—Cases: Baltimore, 3; Richmond, 5; San Antonio, 3.

Leprosy.—Cases: Dallas, 1.

Rocky Mountain spotted fever.—Cases: Nashville, 1.

Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 3; Savannah, 6; Birmingham, 3; Dallas, 1.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 83 cities in the preceding table (estimated population, 1942, 34,061,100)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza Case rates	Influenza Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
New England	0.0	0.0	0.0	0.0	62.1	14.9	42.2	42.2	228.6	0.0	0.0	402
Middle Atlantic	8.9	1.8	3.1	0.4	22.3	14.7	37.5	17.4	45.9	0.0	6.2	88
East North Central	6.4	1.2	1.2	2.3	40.3	11.1	37.4	35.6	89.9	0.0	3.5	140
West North Central	15.1	0.0	2.5	5.0	52.7	12.6	27.6	35.1	95.4	0.0	0.0	90
South Atlantic	8.7	0.0	13.9	5.2	36.4	13.9	46.9	5.2	59.0	0.0	3.5	191
East South Central	11.9	0.0	5.9	0.0	0.0	0.0	59.4	5.9	53.5	0.0	23.8	53
West South Central	23.5	0.0	2.9	5.9	2.9	5.9	55.7	23.5	11.7	0.0	2.9	47
Mountain	25.2	0.0	33.6	8.4	50.4	16.8	8.4	92.5	100.9	0.0	0.0	202
Pacific	5.2	0.0	7.0	0.0	73.4	15.7	33.2	48.9	59.4	0.0	0.0	285
Total	8.9	0.9	4.3	2.0	36.0	12.9	38.6	27.9	73.5	0.0	4.1	131

PLAGUE INFECTION IN CALIFORNIA, MONTANA, AND WYOMING

Plague infection has been reported proved in pools of fleas from rodents collected in California, Montana, and Wyoming on the dates given as follows:

CALIFORNIA

Eldorado County.—August 27, 1943, 12 fleas from 6 golden mantled ground squirrels taken one-half mile south of Camp Richardson, Lake Tahoe, 30 fleas from 4 ground squirrels, *C. beecheyi*, from the same location, and 19 fleas from 19 chipmunks taken 2 miles north of Tallac.

San Diego County.—August 27, 200 fleas from 15 ground squirrels, *C. fisheri*, taken at Lake Henshaw, and 2 pools, each of 200 fleas from 20 ground squirrels, same species, taken from the Cuyamaca State Park at Cuyamaca and from a ranch approximately 31 miles south of Julian.

Santa Clara County.—August 31, 200 fleas from 5 ground squirrels, *C. beecheyi*, taken from property near Mayfield, 1¾ miles south of Highway No. 101.

MONTANA

Custer County.—September 22, 17 fleas from 20 prairie dogs, *Cynomys ludovicianus*, taken from a ranch 21 miles south of Miles City near Highway No. 212.

WYOMING

Johnson County.—September 21, 50 fleas from 50 prairie dogs, *Cynomys ludovicianus*, and 56 fleas from 25 prairie dogs, same species, taken on Powder River on ranches 17 and 12 miles, respectively, south of Arvada; September 22, 120 fleas from 75 prairie dogs, *Cynomys ludovicianus*, taken from a ranch 13 miles southwest of Arvada.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—A report dated October 10, 1943, states that up to this date a total of 404 cases of dengue fever have occurred in Honolulu, Hawaii Territory.

Panama Canal Zone

Notifiable diseases—July 1943.—During the month of July 1943, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	10		1		9		11		31	
Diphtheria [1]	13	1	2				2		17	1
Dysentery (amebic)	3	1			2		5		10	1
Dysentery (bacillary)					2		3		5	
Leprosy			1						1	
Malaria [2]	7				192		78	1	277	1
Measles	3				8				11	
Mumps	47	1	14		81		8		150	1
Paratyphoid fever							1		1	
Pneumonia		7		3	12	3		2	[3] 12	15
Poliomyelitis							1		1	
Scarlet fever			1						1	
Tuberculosis		24		8	7	3		8	[3] 7	43
Typhoid fever							2		2	
Whooping cough					2			1	[3] 2	1

[1] Exclusive of carriers.
[2] 84 recurrent cases.
[3] Cases reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 18, 1943.—During the week ended September 18, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		11	7	31	37	4	15	8	34	147
Diphtheria		16	5	16	1	2		3		43
Dysentery (bacillary)				2						2
Encephalitis (infectious)						1				1
German measles				3	4		2	3	2	14
Influenza		9	4		11				3	27
Measles		4	2	98	47	13	10	22	13	209
Meningitis, meningococcus					7		1		1	9
Mumps		5		4	56	23	3	9	40	140
Poliomyelitis			1	1	12	1	4			19
Scarlet fever		4	5	77	46	18	15	13	14	192
Tuberculosis (all forms)	2	1	6	157	54	11			20	251
Typhoid and paratyphoid fever			1	13	3		1	2	1	21
Whooping cough		1		83	135	20	10	31	37	317

CUBA

Habana—Communicable diseases—4 weeks ended August 21, 1943.—During the 4 weeks ended August 21, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	47	2	Scarlet fever	2	
Malaria	5	1	Tuberculosis	11	1
Measles	6		Typhoid	32	8

Provinces—Notifiable diseases—4 weeks ended September 11, 1943.—During the 4 weeks ended September 11, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	2	1	1	1	10	17
Chickenpox			1			1	2
Diphtheria	1	35	1	1		4	42
Leprosy		2		2	1	2	7
Lethargic encephalitis		1					1
Malaria	28	5	21	27	6	84	171
Measles		8				1	9
Scarlet fever		3					3
Tuberculosis	9	17	11	48	7	44	136
Typhoid fever	12	83	12	51	31	41	230
Yaws						1	1

[1] Includes the city of Habana.

GREAT BRITAIN

England and Wales—Infectious diseases—Years 1940, 1941, and 1942—Comparative.—During the years 1940, 1941, and 1942 cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases (including noncivilians)			Disease	Cases (including noncivilians)		
	1940	1941	1942		1940	1941	1942
Cerebrospinal fever	12,771	11,077	6,029	Poliomyelitis	951	876	581
Diphtheria (including croup)	46,281	50,797	41,404	Puerperal pyrexia and puerperal sepsis	7,627	7,356	8,542
Dysentery	2,860	6,670	7,296	Relapsing fever	10	6	3
Erysipelas	13,123	12,237	11,598	Scarlet fever	65,320	59,432	85,084
Lethargic encephalitis	211	187	148	Smallpox	1	--------	7
Malaria	2	2	2	Tuberculosis	46,572	50,964	52,619
Measles	409,521	409,715	286,341	Typhoid and paratyphoid fever	2,833	4,763	858
Ophthalmia neonatorum	4,390	4,195	4,516	Whooping cough	53,607	173,331	66,016
Pneumonia [1]	47,875	50,942	42,698				
Polioencephalitis	128	83	93				

[1] Includes influenza with pneumonic complications.

England and Wales—Vital statistics—Years 1940, 1941, and 1942—Comparative.—The following table shows the numbers of births and deaths with rates per 1,000 population in England and Wales for the years 1940, 1941, and 1942, and are provisional:

	1940		1941		1942	
	Number	Rate per 1,000 population	Number	Rate per 1,000 population	Number	Rate per 1,000 population
Live births	607,029	14.6	587,228	14.2	654,039	15.8
Deaths, all causes	581,537	14.0	535,180	12.9	480,137	11.6
Maternal deaths	1,640	[1] 2.6	1,678	[1] 2.8	1,673	[1] 2.5
Infant mortality	33,892	[2] 56	34,550	[2] 59	32,257	[2] 49
Deaths from:						
Cancer	68,922	1.662	69,227	1.670	70,409	1.698
Cerebrospinal fever	2,584	.062	2,163	.052	1,206	.029
Diarrhea and enteritis	4,433	.107	4,654	.112	4,927	.119
Diphtheria	2,480	.060	2,641	.064	1,826	.044
Dysentery	185	.004	329	.008	198	.005
Erysipelas	214	.005	190	.005	141	.003
Influenza	11,482	.277	6,901	.166	3,401	.082
Lethargic encephalitis	729	.018	704	.017	590	.014
Malaria	46	.001	19	.000	20	.000
Measles	857	.021	1,145	.028	458	.011
Ophthalmia neonatorum	7	.000	4	.000	4	.000
Pneumonia	29,195	.704	26,418	.637	20,831	.502
Polioencephalitis	54	.001	47	.001	50	.001
Poliomyelitis	107	.003	113	.003	84	.002
Puerperal pyrexia and puerperal sepsis	339	.008	288	.007	283	.007
Relapsing fever	1	.000	--------	--------	--------	--------
Scarlet fever	154	.004	133	.004	103	.003
Tuberculosis	28,144	.679	28,670	.692	25,547	.616
Typhoid and paratyphoid fever	135	.003	148	.004	89	.002
Whooping cough	678	.016	2,383	.057	799	.019

[1] Per 1,000 total births.
[2] Per 1,000 live births.

JAMAICA

Notifiable diseases—4 weeks ended September 25, 1943.—During the 4 weeks ended September 25, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	2	11	Puerperal fever		2
Diphtheria	3	9	Scarlet fever		1
Dysentery		3	Tuberculosis	36	74
Erysipelas		2	Typhoid fever	8	64
Leprosy		4	Typhus fever	8	

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Cochinchina.—During the period August 21–31, 1943, 2 cases of plague were reported in Cochinchina, Indochina.

Madagascar.—For the period July 1 to August 19, 1943, 2 cases of plague with 2 deaths were reported in Madagascar.

Morocco (French).—During the month of August 1943, 5 cases of plague were reported in Marrakech and 1 case of plague was reported in Casablanca, French Morocco.

Smallpox

Algeria.—For the period September 1–10, 1943, 62 cases of smallpox were reported in Algeria.

Indochina.—For the period August 21–31, 1943, 48 cases of smallpox were reported in Indochina.

Morocco (French).—For the month of August 1943, 60 cases of smallpox were reported in French Morocco.

Typhus Fever

Algeria.—During the period September 1–10, 1943, 34 cases of typhus fever were reported in Algeria.

Morocco (French).—For the month of August 1943, 155 cases of typhus fever were reported in French Morocco.

Rumania.—For the period September 24–30, 1943, 23 cases of typhus fever were reported in Rumania.

Slovakia.—During the week ended September 18, 1943, 12 cases of typhus fever were reported in Slovakia.

Yellow Fever

Dahomey—Natitingou.—On August 28, 1943, 1 suspected case of yellow fever was reported in Natitingou, Dahomey.

COURT DECISION ON PUBLIC HEALTH

Venereal disease—exposing another person to.—(Oklahoma Criminal Court of Appeals; *Ex parte Brown*, 139 P.2d 196; decided June 16, 1943.) A habeas corpus proceeding was instituted by the petitioner to secure her release from the State penitentiary. She had been sentenced to imprisonment on a plea of guilty to the crime of exposing a person by the act of sexual intercourse to a venereal disease. The applicable Oklahoma statute made it a felony for any person "after becoming an infected person and before being discharged and pronounced cured by a reputable physician in writing" to "expose any other person by the act of copulation or sexual intercourse to such venereal disease or to liability to contract the same." The information against the petitioner under such statute stated that the petitioner, "being infected with a venereal disease, did * * * expose" a person to such disease.

The question presented to the Oklahoma Criminal Court of Appeals was whether the information should also have alleged that the petitioner had not been discharged and pronounced cured by a reputable physician in writing. The court said that an almost insurmountable burden would be created if it should hold that the State had to prove such an allegation. The State would not possess the information as to who had been administering treatment to the accused or whether she had even been treated. "The prosecution surely would not be required to bring all of the doctors in the community to court to inquire whether they had discharged the patient as cured." It was apparent to it, continued the court, that the provision was inserted as a matter of defense which may be interposed by an accused. The State had to prove beyond a reasonable doubt that the accused had become infected with a venereal disease and that subsequently thereto had exposed another person by some of the means set forth in the statute.

The court's view was that the information against the petitioner was sufficient to allege a violation of the statute and that a commitment on a plea of guilty to such information was sufficient authority for holding the petitioner. The petition for writ of habeas corpus was denied.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.
Price 5 cents. Subscription price $2.50 a year.

Public Health Reports

VOLUME 58 OCTOBER 29, 1943 NUMBER 44

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Public Health Reports

Vol. 58 • OCTOBER 29, 1943 • *No. 44*

SURVEYS OF MILK LABORATORIES IN WAR AREAS IN THE UNITED STATES[1]

I. PRACTICES OBSERVED IN MAKING AGAR PLATE COUNTS[2]

By LUTHER A. BLACK, *Bacteriologist, United States Public Health Service*

SURVEY PROCEDURE

Laboratory methods for controlling the sanitary quality of market milk have been used in this country for about 50 years, and nearly 40 years ago the first committee was appointed by the American Public Health Association to standardize such methods. Since then eight editions of Standard Methods of Milk Analysis have been published, and these standard procedures are supposed to be used by those engaged in official analysis.

For years it has been realized that different laboratories frequently obtain conflicting results upon bacteriological analysis of the same milk supply, and much has been published on the inherent errors and inaccuracies of the methods. These differences assumed greater importance when recognition of the value of milk in nutrition resulted in its greater use by the armed forces as well as by civilians, with consequent increase in the number of fluid milk examinations by various official agencies.

In order to ascertain the actual practice in bacteriological milk analysis, and in the interest of increasing the accuracy and dependability of such analyses, surveys were made of milk laboratories throughout the country. The survey forms prepared were based upon Standard Methods (seventh edition). These forms included one for the agar plate method and one for the direct microscopic and methylene blue reduction methods.

Surveys were made in defense areas beginning in September 1941. The State health departments had been advised that this service was available, and in cooperation with them laboratories doing official analyses were visited and observations made of equipment, general preparation and sterilization of material, the actual technique of

[1] From the Sanitation Section, States Relations Division.

[2] A brief progress report on the agar plate method in the first 281 milk laboratories surveyed was presented at the Laboratory Section of the American Public Health Association meeting at St. Louis, Mo., October 30, 1942, and appeared in the July 1943 issue of American Journal of Public Health.

making the analyses, reading the results and recording or reporting them. With the view of securing closer compliance with Standard Methods, correct procedures were demonstrated and suggested and a blank copy of the survey form left at the laboratory as a guide. A checked copy of the form, accompanied by written recommendations regarding the major deviations in equipment and technique, was submitted later through the proper United States Public Health Service District Office to each State, with a copy for transmittal to each laboratory concerned.

The original survey forms were revised in January 1942, in accordance with experience with the first hundred laboratories surveyed in 20 States east of the Mississippi River. The revised forms were based on the eighth (1941) edition of Standard Methods. In order to avoid misunderstanding, certain items were amplified, frequently after obtaining directly from members of the Standard Methods Committee an interpretation of exactly what was intended. A few inconsistencies and errors in Standard Methods were corrected, and a few items not specified in Standard Methods were included. The additional material not in Standard Methods, but found to be necessary by experience, was taken up previously with the referee of that section of Standard Methods and included other ways of obtaining the same result (such as maximum-minimum thermometer instead of thermometer in container of liquid) or actual listing of something assumed in Standard Methods (such as using a separate pipette for each sample and for each dilution).

An additional form was also prepared on which certain miscellaneous information not required by Standard Methods could be recorded, such as space and facilities of the laboratory. This form also listed the requirements of Standard Methods on sampling and certain requirements of health department practice pertaining to milk analysis where communities operated under the Milk Ordinance and Code recommended by the United States Public Health Service.

While earlier surveys had included only the larger defense areas, after war was declared an attempt was made to include all laboratories doing official analyses in each State, inasmuch as most places large enough to maintain a laboratory either were or might become war areas.

Of the 408 laboratories making official bacteriological milk analyses that were surveyed in the 48 States and the District of Columbia, 399 used the agar plate method (table 1). Of these, 33 also used the direct microscopic examination, and 57 used the methylene blue reduction method for samples of producers' milk. In addition to these 399 laboratories, 4 laboratories used the direct microscopic method and 3 additional laboratories used methylene blue reduction (with 1 addi-

tional place using both procedures) as the sole procedure in the control of retail pasteurized and raw milk. Compilations were made of the number of laboratories conforming to or deviating from each subitem of equipment, preparation, technique, and reporting required by Standard Methods.

TABLE 1.—*Milk laboratories surveyed, showing methods used in official analyses*

Geographic division [1]	Agar plate method	Additional tests for producers' milk only		Sole test used			Total labora-tories
		Direct micro-scopic	Methylene blue reduction	Direct micro-scopic	*Used both*	Methylene blue reduction	
New England	29	5		1			30
Middle Atlantic	20	6					20
East North Central	32	7	9				32
West North Central	112	6	23		1	2	115
South Atlantic	57	5	14	3			60
East South Central	19	1	1				19
West South Central	82		[2] 7				[2] 83
Mountain	40	3	2			1	41
Pacific	58		1				58
Total	399	33	[2] 57	4	1	3	[2] 408

[1] These correspond to the geographic divisions used in the United States Census Reports.
[2] Includes one laboratory sending retail pasteurized samples elsewhere for plate counts.

In the interest of clarity, the figures presented in the following tables list only *deviations*, items *undetermined* because of local conditions at the time of the survey, or items *not used* in the particular laboratory. Thus, at a glance common deviations may be singled out; some of these will be discussed briefly. The entire survey form has been divided into sections, and the material arranged so the results could be tabulated. The last 284 of the 399 laboratories reported upon were recorded on the revised forms and, in preparing the tables, the results of the first 115 laboratories recorded on the earlier form were also tabulated upon the present forms. This resulted, in some instances, in unduly large figures for items marked *undetermined*, where such an item was not included on the original forms. Furthermore, the earlier surveys were based on the seventh edition of Standard Methods while the revised forms, based on the eighth edition, included a few additional items. Consequently, these were marked *not used* when transferring the earlier surveys to the revised forms.

APPARATUS

The requirements of Standard Methods pertaining to apparatus, and a summary of the results showing deviations from Standard Methods, are listed in table 2 by geographic divisions with the totals for all States.

Table 2.—*Summary of items pertaining to apparatus used in bacterial plate count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories surveyed	399			29			20			32			112			57			19			32			40			58		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
4. Pipettes—A. P. H. A. specifications or accurately calibrated	177	3		8			8			18			38			27	2		12			13			23			30	1	
Tips unbroken	17	4		2			2			1			3	1		4			1			2			0			2	3	
Stored and handled in suitable containers (paper allowed)	12	5		0			0			0			6	2		1			0			1			4	2			1	
5. Dilution bottles—preferably resistant glass		1		0			0			0			0			0				1		0			0			0		
Graduation marked indelibly	180	12	6	18	4		11	3		14	1		50	3	1	29		5	7			14	1		14			23		
Solid stoppers or leakproof closures	67	7		3			7	1		8	1		17			14			2			1			8	1		7	4	
6. Petri dishes—100 mm. x 15 mm.	35	1		0			2			1			19	1		6			1			3			3			0		
Flat bottoms	2	3		0				2		0			2	1		0			0			0			0			0		
Free from defects	8	10		0				1		1	1		4	3		1			1				3		1	1			1	
Stored and handled in suitable containers (paper allowed)	5	71		0			0			2			2	30			5		0				6		1	12			18	
7. Thermometers—accuracy checked with thermometer conforming to specifications of National Bureau of Standards	260	50		16	6		10	7		19	8		72	5		41	5		14			25	4		31	4		38	11	
8. Incubator—water jacket filled or low temperature units or suitable area in constant temperature room within tolerance	91	25			1		1			8	2		36	8		8	2		4			7	3		15	1		12	8	
Shelves suitably spaced	4	8		0			0			0			4	4			1		0			0				3		0		
Temperature variations checked (with incubator filled)	187	59		7	7		7	3		6	7		60	17		37	2		11	2		21	2		19	9		19	10	
Not less than 20″ x 20″ x 24″ high (or equivalent space)	110	4		4			3	2		5	1		38			26			3	1		8			11			12		
Kept in room of suitable temperature	0			0			0			0			0			0			0			0			0			0		
Where room temperature is too high provide cooling			399			29			20			32			112			57			19			32			40			58
9a. Media-making equipment—glass or other suitable utensils (which will not contaminate with toxic materials such as copper, zinc, antimony, chromium, etc.)	6	25		1	3			7		1	5		2	2		1	1			1			1			2		1	3	

9b. Hydrogen-ion—accurate and reliable colorimetric standards or dependable electrometric equipment	126	39	----	3	1	----	0	----	----	2	12	----	57	8	----	15	3	----	----	4	----	15	1	----	18	9	----	16	1	----
9c. *Melted agar*—(desirable) constant temperature water bath or incubator at 45°–50° C	257	62	----	4	17	----	2	5	----	9	16	----	96	3	----	40	10	----	9	4	----	21	2	----	29	4	----	47	1	----
d. Counter—uniform and properly controlled illumination (equivalent to Quebec counter)	175	24	----	3	4	----	9	1	----	14	----	----	54	12	----	28	4	----	2	----	----	16	----	----	24	3	----	25	----	----
Magnification	37	8	----	0	----	----	----	1	----	2	1	----	11	1	----	7	1	----	0	----	----	7	----	----	7	2	----	3	2	----
Ruled guide plate (rulings in squares preferred)	35	9	----	0	----	----	1	----	----	0	----	----	19	4	----	5	----	----	1	----	----	3	----	----	4	5	----	2	----	----
9e. Tally—mechanical hand tally	178	2	----	9	----	----	5	1	----	12	----	----	56	----	----	32	1	----	9	----	----	15	----	----	24	----	----	16	----	----
10. Hot air oven—suitable size	5	29	15	----	1	----	----	3	----	1	2	----	2	11	9	----	4	1	0	----	----	1	2	1	1	2	2	----	4	2
Proper construction	2	12	15	0	----	----	0	----	----	1	1	----	1	4	9	----	2	1	0	----	----	----	----	1	----	1	2	----	4	2
Suitable vents	4	8	15	0	----	----	0	----	----	2	1	----	----	2	9	1	4	1	0	----	----	----	----	1	1	1	2	----	----	2
Temperature variations within oven checked	317	29	15	20	6	----	16	3	----	15	8	----	92	5	9	45	3	1	15	1	----	27	1	1	36	----	2	51	2	2
Equipped accurate thermometer	79	37	15	3	3	----	4	1	----	8	----	----	22	9	9	11	5	1	2	----	----	11	5	1	6	10	2	12	4	2
11. Autoclave (or pressure cookers)—suitable size	7	18	1	----	1	----	----	1	----	----	1	----	2	2	1	2	2	----	0	----	----	----	1	----	----	4	----	3	6	----
Proper construction	----	5	1	0	----	----	0	----	----	0	----	----	----	2	1	----	2	----	0	----	----	0	----	----	0	----	----	----	1	----
Equipped accurate thermometer	209	7	1	12	----	----	14	----	----	12	3	----	62	2	1	23	----	----	8	----	----	13	1	----	28	1	----	37	----	----
Accurate pressure gauge	9	8	1	0	----	----	0	----	----	----	1	----	4	2	1	3	2	----	0	----	----	----	2	----	1	1	----	1	----	----
Safety adjusted	----	----	1	0	----	----	0	----	----	0	----	----	----	----	1	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----

De=Deviations. Un=Undetermined. No=Not used.

As shown in item 4, nearly half of the laboratories were using, in whole or in part, pipettes that did not meet the specifications required by Standard Methods. Their use naturally resulted in errors in measurement also, as will be seen later. Similarly, nearly half of the laboratories used dilution bottles without markings; consequently errors in volume (which were quite common, as will be seen later) if present, would not be observed. It is interesting to note that nearly 20 percent of the laboratories were not using solid stoppers or leak-proof closures, with consequent failure to agitate the dilutions as required by Standard Methods (also to be seen later).

Only 20 percent of the laboratories had checked the accuracy of the thermometers used in incubators, as shown in item 7. Approximately 70 percent had suitable incubators, although less than half had checked the temperature variations of the incubators in use. Approximately one-fourth of the incubators in use were smaller than the minimum required by Standard Methods. As far as could be ascertained, all incubators were kept in a room of suitable temperature, this being one of the five items of the total 168 subitems of equipment and procedure recorded on the survey form for agar plate count for which deviations were not noted in any laboratory. The last requirement in item 8 appeared in the eighth edition only, accounting for the large numbers in the *not used* column.

Nearly 40 percent of the laboratories did not have hydrogen-ion standards available for checking the pH of media.

As shown in item 9c, the form included one item of equipment not now required by Standard Methods, namely, a constant temperature water bath or incubator for holding melted agar. Since lack of this control was the most common reason for trouble with precipitates in using the standard milk agar, this item was included but marked (*desirable*).

It is important to note (item 9d) that half of these official laboratories did not have an approved colony counter. In spite of the usual deficiencies in other equipment and common errors in technique, some of the greatest errors in results were due to failure of the laboratory workers to observe the actual colonies present on their own plates, usually due to lack of, or an inadequate, counting device.

The information on hot air ovens and steam pressure sterilizers is presented in items 10 and 11. To many the least important requirement in Standard Methods is that concerning checking temperature variations within the hot air oven. Usually laboratories tend to use higher temperatures or longer periods of sterilization than the minimum, or exceed in both respects. Occasionally, however, a laboratory will operate the oven at the minimum time and temperature listed in Standard Methods, without realizing that there may be a number of degrees variation within the oven. A few laboratories were visited in which this had been discovered by sad experience.

It is to be noted that while only 10 percent had checked the temperature variations, yet over one-fifth of the laboratories felt able to operate their sterilizing ovens without thermometers. Similarly, not quite half of the steam pressure sterilizers in use were equipped with thermometers.

PREPARATION AND STERILIZATION OF MATERIALS

The requirements of Standard Methods pertaining to the general preparation and sterilization of materials, media, and dilutions, and the deviations observed, are presented in table 3. The sterilization procedures are summarized in item 12. In general these were satisfactory, although lack of control by thermometer is shown, particularly in steam sterilization.

The cleansing of glassware, shown in item 13, was, as might be expected, apparently well done in almost every laboratory.

The standard tryptone glucose extract agar was used by approximately 80 percent of the laboratories. Approximately 90 percent of these laboratories added skim milk, about 80 percent of them using this without trouble with precipitates (item 14). However, only 15 percent of the laboratories checked the final pH of the media, and less than 5 percent kept a record of the results.

The deviations relative to dilutions are shown in item 15. Only 10 percent of the laboratories had ever tested the suitability of the water used for dilution. Deviations in volume were quite common, only 40 percent being within the tolerance allowed by Standard Methods. Variations of 10 ml. per 99 ml. blanks were not infrequent. An extreme variation of approximately 40 ml. was observed, which resulted in a volume ranging from 60 ml. to 140 ml. Certain aspects of the subitem on volume control were noted separately (segregated by parentheses in table 3) for the 228 laboratories deviating in one or more of these four requirements.

MAKING DILUTIONS

The requirements of Standard Methods pertaining to technique in making dilutions, together with deviations observed, are summarized in table 4.

The agitation of samples is summarized in item 17. In general the retail samples were well mixed, and 80 percent of the laboratories did this immediately before removal of the portion for analysis. Samples in smaller bottles and vials, however, were not agitated, as prescribed, by many laboratories. A number of laboratories did not use small sample bottles or vials, or used other methods of agitation in such containers, accounting for the larger numbers in the *not used* column. Similarly, a majority of the laboratories failed to agitate dilutions (item 18) as vigorously as prescribed in Standard Methods.

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Table 3.—*Summary of items pertaining to preparation of materials used in bacterial plate count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories surveyed	399			29			20			32			112			57			19			32			40			58		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
12. Sterilization—Sampling and plating equipment: dry heat whenever possible	28	4	1	0			1			3			9				2	1	2			3			5	1		5	1	
Not less 160° C	36	82	19		5		2	4		4	6		10	25	9	4	12	1	4	1			9	1	6	10	4	6	10	4
Not less 1 hour	9	14	20	0				1	1		4		2	7	9	2		1		2				1	2		4	3		4
Not crowded	2	4	24	0					1			3	2	3	8		1	1			2			1			4			4
If chance of careless operation, record temperature used	19	24	341		1	28		1	16	2	4	21	6		106	1	7	45	7	1	8	3	4	25		1	39		5	53
Record time attained, discontinued	7	23	353		1	28		1	16	1	5	21	1		111		5	48	4	1	10	1	4	27		1	39		5	53
Media, dilutions: autoclave 121° C. (place reliance on mercury thermometer, not on pressure gauge)	204	95		1	23			15		2	19		83	6		17	21		9	5		22	3		32	1		38	2	
Not less than 20 minutes	25	8	1	2			0			3	2		8	1	1	5	1			1		2	2		4			1	1	
Not crowded	1	4	1	0			0			1				1	1	0			0				1		0				2	
Air removed	2	6	1	0				1		0			2	1	1		3		0			0			0				1	
Tight stoppers loosened	5	3	12	0			0				1		1	1	9	2	1		1					2	1		1	0		
If chance of careless operation, record temperature used	12	23	348		1	28		1	15	3	4	20			112	1	6	46	7	1	8	1	4	27		1	39		5	53
Record time attained, discontinued	8	23	351		1	28		1	15	1	5	21	1		111		5	48	5	1	9	1	4	27		1	39		5	53
13. Cleansing—Pipettes: cleaning solution used frequently	41	26		2				1		2	1		25	14		3	3		1	1			4	1	1	1		3	4	
Subsequent rinse	1	7		0				5		1	1		0				1		0			0			0			0		
Glass and metal ware: rinsed thoroughly in clean water after washing		1		0			0			0			0				1		0			0			0			0		
Acid or alkali not found by suitable indicator	3	97			29		0				32		1			2	14			19			3		0			0		
14. Media—Correct formula (beef extract, tryptone, glucose, best quality agar), or dehydrated media	79	5		5			4			6			24	2		15			2	1		5			13			5	2	
Distilled water	24	8		2			2			1			5	5		3			0				1		1	1		10	1	
Skim milk	114	7		5			4			9			37	5		20			2			9	1		20	1		8		
Use glass or suitable utensils free from toxic metals	5	23		1	3			7		1	5		1	3		1	1			1			1			1		1	1	

Prevent specks of dried or undissolved agar	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----
Prevent undissolved milk powder or its precipitates	46	134	1	1	3	----	----	4	----	----	11	----	22	44	----	2	25	----	----	1	----	6	10	----	10	23	----	5	13	1
Unless dehydrated or within range, adjust to pH 6.6-7.0	11	3	24	0	----	----	2	----	----	0	----	----	2	1	17	4	1	----	1	----	----	2	----	7	0	----	----	----	1	----
Use suitable pH standards or equipment	14	46	112	3	9	----	----	5	----	3	12	2	3	2	49	----	3	16	----	4	----	1	----	15	2	8	16	2	3	14
Lost weight restored with hot distilled water (unless dehydrated)	1	14	42	0	----	----	----	2	----	----	1	----	----	7	35	----	2	----	0	----	----	----	1	7	0	----	----	1	1	----
If necessary, suitable clarification not affecting nutritive properties	1	2	----	----	1	----	0	----	----	1	----	----	----	1	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----
Suitable containers	4	2	----	0	----	----	0	----	----	0	----	----	2	1	----	1	----	----	0	----	----	1	1	----	0	----	----	0	----	----
Amount in containers limited so any part is within 2.5 cm. of surface	38	12	----	2	1	----	3	1	----	3	1	----	8	2	----	5	1	----	2	----	----	2	----	----	2	6	----	11	----	----
Suitable storage of flasks or bottles	3	2	1	0	----	----	0	----	----	0	----	----	2	1	1	0	----	----	1	----	----	0	----	----	----	1	----	0	----	----
Final pH determined immediately before batch is used	311	22	----	16	5	----	7	4	----	23	5	----	99	6	----	47	----	----	16	----	----	31	----	----	32	1	----	40	1	----
And pH recorded	376	10	----	28	----	----	15	4	----	29	2	----	112	----	----	49	1	----	18	----	----	32	----	----	38	1	----	55	2	----
15. Dilutions — Suitability of waters determined by plating dilutions periodically for 30 minutes	351	7	5	25	1	----	15	2	----	27	1	----	98	1	5	52	----	----	14	1	----	32	----	----	36	1	----	52	----	----
Not used if cause decreased count	----	356	5	----	26	----	----	17	----	----	27	----	----	98	5	----	52	----	----	15	----	----	32	----	----	37	----	----	52	----
Retested occasionally for freedom from toxic substances	374	8	5	25	4	----	17	2	----	30	----	----	104	----	5	54	----	----	18	----	----	32	----	----	39	1	----	55	1	----
Prevent precipitates from the water	2	----	----	0	----	----	0	----	----	0	----	----	1	----	----	0	----	----	1	----	----	0	----	----	0	----	----	0	----	----
Volume necessary before sterilization predetermined	(124)	(12)	----	(4)	(1)	----	(2)	(1)	----	(6)	(4)	----	(61)	(2)	----	(17)	(1)	----	(2)	----	----	(9)	----	----	(14)	(2)	----	(9)	(1)	----
Each bottle observed for volume deviation	(79)	(9)	----	(1)	(5)	----	(0)	----	----	(0)	----	----	(56)	----	----	(8)	(2)	----	----	(1)	----	(10)	(1)	----	(3)	----	----	(1)	----	----
Discard if variation from 99 ml. exceeds ±2 ml	(204)	(16)	----	(7)	(4)	----	(6)	(1)	----	(12)	(3)	----	(76)	(2)	----	(24)	----	----	(4)	(1)	----	(17)	(1)	----	(25)	(3)	----	(33)	(1)	----
Or proportional tolerance if smaller quantities	(49)	(8)	----	(1)	----	----	(4)	(2)	----	(1)	(1)	----	(18)	----	(1)	(8)	(2)	----	(0)	----	----	(4)	----	----	(9)	(1)	----	(4)	(1)	----
Or used promptly if measured sterilized water is added aseptically to sterile bottles	228	44	----	9	9	----	8	3	----	14	8	----	85	6	----	28	6	----	4	3	----	19	2	----	26	3	----	35	4	----

De=Deviations. Un=Undetermined. No=Not used.

TABLE 4.—*Summary of items pertaining to technique in making dilutions used in bacterial plate count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories surveyed	399			29			20			32			112			57			19			32			40			58		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
16. Plate marking—before making dilutions arrange in order	70	5		2				1		6			31	1		4	1		0			9			11			7	2	
Identify with sample number	5	1		0				1		1			3			0			0			0			0			1		
Mark with dilution	4	9	1		4			1		1	1		3	1			1			1		0			0					1
17. Sample agitation—agitate vigorously	18	18			7			1		1	4		6	6		2			5			1			1			2		
Mix thoroughly	13	22			7			1		1	4		2	9		2			5			1				1		2		
Immediately before removing portion	65	14		3				1		0			17	3		6	1		3	1		7	2		10	3		19	3	
Before opening container remove all material from closure which may contaminate sample	6	63	1		2			1			2			43	1	2			0			4	5			9			1	
Sample bottles and vials: shake 25 times	66	15	136	1		6		4	2	2		16	20	1	52	16	7	18	7		2	8		9	6		22	6	3	9
Up and down excursion	127	14	136	3		6	1	3	2	2		16	42	3	52	23	6	18	10		2	19	1	9	10		22	17	1	9
About a foot	159	19	136	3		6		4	2	2		16	50	4	52	28	5	18	10		2	18	2	9	15	1	22	33	3	9
Within 7 seconds	17	27	136		4	6	1	3	2			16	4	10	52	4	7	18	2		2	1	1	9	2	2	22	3		9
18. Dilution agitation—immediately before removing portion	62	14	1	1				1		1			22	4	1	4			2			5	3		8	1		19	5	
Shake 25 times	124	8	1	3			3	1		11			40	4	1	25			5			9			20	1		8	2	
Up and down excursion	240	5	1	10			12	2		22			73	2	1	42			14			25	1		24			18		
About a foot	342	12	1	20	3		12	3		26			105	2	1	50	1		17			28	1		38			46	2	
Within 7 seconds	33	21	1		1		2	4		3	2		12	8	1	3	4		1			2	1		7	1		3		
19. Sample measurement—separate sterile pipette for each sample	1	2		0				1		0			1			0				1		0			0			0		
Pipette not wiped or dragged across lip or neck	3	6		1	1			2		0			2			0			0			0				2			1	
Measure accurately	209	49		10	7		7	6		11	5		72	9		27	10		2			21	1		29	5		30	6	
No extra drops falling in	97	67			1		3	5		0			66	26		3	11		0			8	2		7	14		10	8	
Let column drain	4	1		0				1		0			1			0			0			0			0			3		
Blow out last drop quickly	148	27	35	12	3		5	7		7	8		35	7	19	26	1	2	12			22		2	12	1	2	15	10	
Pipette not rinsed in dilution	37	4		0			2	1		0			16	1		9			2			1			5	2		2		
Cream—preferably weigh 1.0 gm. aseptically		5	390			29			20			31			112		4	53			19			32			40		1	54
Into sterile butter boat or into dilution bottle		4	390			29			20			31			112		4	53			19			32			40			54

On accurate cream test torsion balance or equivalent sensitivity	----	4	390	----	----	29	----	----	20	----	----	31	----	----	112	----	4	53	----	----	19	----	----	32	----	----	40	----	----	54
If use pipette, free from air bubbles	----	332	60	----	28	----	----	20	----	----	25	4	----	87	24	----	44	12	----	18	----	----	27	5	----	28	12	----	55	3
And volume delivered predetermined	246	88	60	----	28	----	----	20	----	2	24	4	88	----	24	34	10	12	12	6	----	27	----	5	28	----	12	55	----	3
20. Dilution measurement—separate sterile pipette for each successive dilution	16	3	----	0	----	----	1	1	----	2	----	----	9	1	----	----	2	1	1	----	----	0	----	----	0	----	----	1	----	----
Pipette not wiped or dragged across lip or neck	3	9	----	----	4	----	----	1	----	0	----	----	----	2	----	2	----	----	0	----	----	----	1	----	----	1	----	1	----	----
Measure accurately	171	110	----	3	15	----	3	7	----	4	10	----	75	19	----	26	13	----	3	----	----	17	7	----	22	15	----	18	24	----
No extra drops falling in	81	74	----	0	----	----	----	5	----	0	----	----	63	31	----	4	12	----	1	----	----	9	6	----	----	10	----	4	10	----
Tip of pipette at 45° angle	10	3	----	0	----	----	----	1	----	----	1	----	4	----	----	0	----	----	0	----	----	5	1	----	0	----	----	1	----	----
Touching neck of dilution bottle or rod in stopper	293	42	----	16	6	----	8	7	----	4	15	----	108	1	----	45	2	----	----	7	----	28	----	----	37	----	----	47	4	----
Touching Petri dish	107	19	----	5	2	--	3	2	----	4	1	----	32	9	----	25	2	----	3	----	----	8	----	----	12	2	----	15	1	----
Let column drain	6	5	----	0	----	----	----	1	----	0	----	----	1	1	----	1	2	----	1	----	----	0	----	----	0	----	----	3	1	----
Touch once against dry glass	256	28	43	19	6	----	8	8	----	22	4	----	69	2	26	43	3	----	17	----	----	20	2	1	29	1	3	29	2	13
Petri dish cover raised carefully just enough to insert pipette	11	5	----	0	----	----	----	1	----	0	----	----	6	4	----	1	--	----	0	----	----	0	----	----	1	----	----	3	----	----
21. Dilution selection—2 dilutions plated per sample (single plate restricted to supplies uniformly yielding 30–300 colonies)	121	18	----	9	5	----	2	6	----	11	2	----	29	2	----	16	1	----	4	----	----	4	----	----	11	1	----	35	1	----

De=Deviations. Un=Undetermined. No=Not used.

In item 19 it may be seen that inaccurate volumetric measurements of the sample were made in over half of the laboratories, partly as a result of not having standard pipettes and partly due to improper manipulation.

Similarly, errors were commonly made in measurement of the dilution itself, as shown in item 20. Item 21 shows that one-third of the laboratories surveyed did not make suitable dilutions to yield the required number of colonies per plate for proper accuracy.

PLATING AND INCUBATION

The requirements of Standard Methods, and observed deviations in the technique of plating and incubation, are shown in table 5. Nearly half of the laboratories did not plate out controls regularly, and other errors in plating were frequent. The large number of laboratories having no constant temperature control over melted agar resulted in the large numbers in the *undetermined* column concerning the temperature of agar when poured. Certain aspects of the actual technique of plating were fairly well done in general, as would be expected in laboratories accustomed to plating.

Comparatively few laboratories controlled the temperature of incubation in accordance with Standard Methods (item 23). Temperatures of 33°–42° C. were observed frequently in incubators supposedly operating at 37° C. Only 60 percent of the incubators were definitely operated within the proper range of temperature, 20 percent were obviously outside of the allowable limits, and in 20 percent of the laboratories this was questionable. Only five laboratories were noted in which the optional 32° C. incubation was being used.

COUNTING AND REPORTING RESULTS

The requirements of Standard Methods, and observed deviations in the technique of counting and reporting results, are shown in table 6.

In spite of errors in equipment, preparation of material, technique of plating, and incubation, the greatest effects observed upon the accuracy of results occurred where the proper plates for counting were not selected in accordance with the requirements of Standard Methods, or where laboratory workers failed to observe a considerable percentage of colonies on their plates, largely because of inadequate counting equipment. That this was quite common is shown in item 24. Actually only 17 of the 399 laboratories reported upon complied fully with the requirements relative to counting (table 7). Many laboratories failed to count all visible colonies on the entire plate, including pinpoints, and their counts could not be duplicated within the 10-percent variation allowed by Standard Methods.

The two items marked with an asterisk are required only under the Milk Ordinance and Code recommended by the United States Public Health Service, hence their listing as *not used* in communities not operating under this ordinance. In many places suitable plates were not available at the time of the survey, again resulting in large numbers in the *undetermined* column with respect to duplication of counts within the tolerances listed by Standard Methods.

Finally, records were usually not kept as required by Standard Methods (item 25). It might be mentioned that in several instances laboratory workers failed to multiply correctly; keeping the required original record of the dilution and colonies actually counted would serve as a check on such errors. In a few instances the mathematics of making or of multiplying for a 1:100 dilution were in error. In one small town only one cipher had been used for years in multiplying for the 1:100 dilution, and the same error was made for months in a metropolitan city. In one smaller city a 1:1,000 dilution and in another a 1:10,000 dilution were used and calculated as though 1:100.

The requirements concerning the recording of the incubation temperature used and the reporting of plates with less than 30 colonies were included only in the eighth edition, and one subitem (marked with an asterisk) is required only under the Milk Ordinance and Code recommended by the United States Public Health Service. This accounts for the larger numbers for these details shown in the *not used* column.

DISCUSSION

While some of the requirements in Standard Methods may seem trivial, the author has seen practically every item violated sufficiently by some laboratory to influence the accuracy of the analysis.

The surveys show that every item required by Standard Methods has been adhered to by several laboratories, and that practically every item has been neglected by one or more laboratories. Not one laboratory, at the time surveyed, actually met all requirements on equipment and procedure, although a very few approached this. No laboratory conformed in all items of even the general group on technique. Only 1 laboratory conformed in apparatus, 1 in preparation, 4 in incubation, 17 in counting, and 34 in reporting results (table 7). Table 7 also classifies the nature of the laboratories included in this report.

The average number of deviations per laboratory (not including items undetermined or not used) from the 168 subitems relating to agar plate counts ranged by States from a low of 13 to a high of 48 with a mean of 32.

TABLE 5.—*Summary of items pertaining to plating and incubation used in bacterial plate count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories surveyed	399			29			20			32			112			57			19			32			40			58		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
22. Plating—dilution control, each series of samples, each lot blanks	170	18	...	10	5	...	...	2	...	10	...	...	66	6	...	22	1	...	8	...	...	14	3	...	10	...	...	21	1	...
Agar control at end	67	6	...	0	...	...	...	1	...	0	...	...	41	5	...	13	...	...	1	...	...	2	...	...	5	...	...	5	...	...
Desirable, melted agar kept only short time	6	3	...	1	...	...	...	1	...	1	1	...	3	...	...	0	...	...	1	...	...	0	...	...	...	1	...	0	...	...
45°–50° C	178	114	...	4	17	...	3	6	...	8	17	...	60	22	...	21	19	...	8	4	...	10	13	...	28	9	...	36	7	...
Thermometer in container of water as temperature control in water bath or incubator	363	8	...	25	2	...	14	4	...	30	...	...	101	...	...	52	2	...	19	...	...	30	...	...	39	...	...	53	...	...
After depositing desired portions, introduce 10–12 ml. of agar per plate	39	9	...	1	...	...	3	3	...	3	2	...	20	1	...	6	...	...	1	1	...	2	...	...	1	1	...	2	1	...
Liquefied, not lumpy	9	5	...	0	...	...	...	1	...	0	...	...	6	2	...	1	1	...	0	...	...	2	...	...	...	1	...	0	...	...
At 41°–44° C	23	268	...	...	27	...	...	12	...	4	23	...	12	72	...	4	37	...	...	11	...	1	17	...	2	27	...	...	42	...
Within 20 minutes after transfer from sample	53	39	...	5	3	...	...	2	...	5	2	...	22	15	...	7	3	...	...	1	...	3	2	...	6	5	...	5	6	...
Petri dish cover raised carefully just enough to pour agar	10	6	...	1	1	...	1	1	...	0	...	...	7	3	...	2	...	...	2	...	...	1	...	...	1	1	...	4	...	...
Flame lip of media container before pouring	21	4	...	0	...	...	1	1	...	0	...	...	11	1	...	3	...	...	0	...	...	1	1	...	3	...	...	2	1	...
Periodically thereafter	86	15	31	0	...	...	2	2	...	0	...	...	39	4	27	7	1	1	1	...	...	9	...	2	14	1	1	14	7	...
Agar and sample thoroughly mixed	18	60	...	2	14	...	...	11	...	...	8	...	11	6	...	3	12	...	...	3	...	...	3	...	1	7	...	1	2	...
Spread evenly	1	1	...	0	...	...	...	1	...	0	...	...	1	...	...	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...
By rotation and tilting	150	35	1	11	4	...	3	9	...	20	1	...	47	7	...	16	8	1	12	2	...	13	2	...	15	...	...	13	2	...
Without splashing	53	23	...	...	2	...	2	2	...	4	1	...	37	12	...	1	...	...	1	...	...	1	...	...	1	1	...	6	5	...
Solidified quickly	...	2	...	0	...	...	...	1	...	0	...	...	0	...	...	0	...	...	0	...	...	...	1	...	0	...	...	0	...	...
On level surface	10	4	...	0	...	...	...	1	...	0	...	...	9	3	...	0	...	...	0	...	...	0	...	...	1	...	...	0	...	...
Inverted (unless clay tops are used)	5	2	...	0	...	...	...	1	...	0	...	...	5	...	...	...	1	...	0	...	...	0	...	...	0	...	...	0	...	...
Placed in incubator at once	...	8	...	0	...	...	...	1	...	0	...	...	...	3	...	0	...	...	...	1	...	...	2	...	...	1	...	0	...	...
Record time of plating if interval between sampling and plating exceeds 4 hours	147	91	...	9	12	...	6	9	...	14	6	...	31	24	...	20	9	...	12	1	...	17	2	...	8	11	...	30	17	...

23. Incubation—plate piles at least 1 inch from each other	145	82	----	9	7	----	7	7	----	8	16	----	41	19	----	22	11	----	11	4	----	15	3	----	15	5	----	17	10	----
And from tops and walls	82	52	----	2	5	----	1	3	----	3	9	----	25	14	----	12	10	----	7	3	----	7	1	----	14	4	----	11	3	----
Piles on successive shelves not staggered	15	3	6	0	----	----	0	----	----	0	----	----	6	----	6	3	1	----	0	----	----	3	1	----	1	----	----	2	1	----
Incubated 48 hours	3	2	----	0	----	----	1	----	----	0	----	----	1	1	----	1	----	----	0	----	----	0	----	----	----	1	----	0	----	----
35°–37° C. or 32° C	83	75	----	----	5	----	2	7	----	1	9	----	44	16	----	7	10	----	4	1	----	12	5	----	6	14	----	7	8	----
Thermometer in securely stoppered container of liquid (or accurate maximum-minimum thermometer) as temperature control on top shelf and on bottom shelf (or in portion of incubator room used)	358	6	----	28	----	----	15	----	----	29	----	----	94	3	----	52	2	----	19	----	----	32	----	----	37	----	----	52	1	----
Temperatures recorded daily when in use for milk plates	381	1	----	28	----	----	17	----	----	29	----	----	108	----	----	55	----	----	19	----	----	32	----	----	39	----	----	54	1	----
Excess humidity avoided	3	3	----	0	----	----	1	----	----	0	----	----	1	1	----	0	----	----	0	----	----	----	1	----	1	----	----	----	1	----
Excess ventilation avoided (weight loss within 15 percent)	1	1	----	0	----	----	0	----	----	----	1	----	1	----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----

De=Deviations. Un=Undetermined. No=Not used.

549820°—43——3

TABLE 6.—*Summary of items pertaining to counting and reporting counts used in bacterial plate count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories surveyed	399			29			20			32			112			57			19			32			40			58		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
24. Counting plates—count within 48 hours ± 3 hours, or place in refrigerator under 50° F. for not over 16 hours (not routine)	7	10	...	0	...	...	0	...	...	1	1	...	1	5	...	2	1	...	1	2	...	0	...	...	...	1		2	...	...
Average all plates with 30–300 colonies and no others (except average all plates of same dilution)	206	41	...	7	10	...	14	5	...	13	7	...	85	5	...	41	5	...	7	2	...	25	...	...	25	5	...	49	2	...
If higher plate count is more than twice the lower, record the lower*	92	40	214	...	...	29	...	...	20	...	9	16	48	4	50	8	12	25	5	7	4	14	3	4	12	2	22	5	3	43
Count all visible colonies on entire plate including pin points	134	49	...	9	3	...	...	3	...	9	1	...	53	16	...	12	4	...	2	1	...	20	1	...	9	12	...	20	8	...
Count spreaders as single colony	5	6	...	0	...	...	0	...	...	0	...	...	3	4	...	2	2	...	0	...	...	0	...	...	0	...	...	0	...	...
If indication that spreader has repressed other colonies do not count plates	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...	0	...	...
If spreader covers more than half the plate do not count*	...	...	161	...	...	29	...	...	20	...	...	20	0	...	...	...	...	24	...	...	4	...	...	3	...	...	10	...	...	44
Not more than 5 percent of plates ¼ covered with spreaders	23	8	...	1	1	...	1	1	...	2	...	...	10	4	...	4	...	...	0	...	...	2	1	...	1	...	...	2	1	...
Use approved counting aid	164	19	...	2	2	...	10	...	...	13	1	...	48	7	...	28	...	...	1	1	...	16	1	...	24	4	...	22	3	...
Any doubtful particles examined carefully	100	78	...	0	...	...	...	6	...	2	4	...	55	36	...	3	5	...	1	1	...	13	2	...	12	12	...	14	12	...
Use hand tally	214	7	...	14	2	...	5	1	...	13	...	...	67	1	...	35	...	...	10	...	...	17	1	...	25	1	...	28	1	...
Duplicate own counts within 5 percent	28	165	...	1	20	...	1	18	...	1	20	...	7	33	...	4	35	...	2	4	...	4	5	...	3	22	...	5	8	...
Duplicate others' counts within 10 percent	110	100	...	1	11	...	1	18	...	5	10	...	50	7	...	4	27	...	2	2	...	18	1	...	11	21	...	18	3	...

If no plates 30-300, use that nearest 300	19	39	----	0	----	----	----	2	----	1	----	----	7	2	----	----	2	----	0	----	----	7	3	----	2	1	----	2	29	----
Estimations of plates exceeding 300: (a) if 5-10 colonies per sq. cm. count 12-14 sq. cm. areas, or if over 10 count 4 areas; factor for multiplication determined; or (b) use counting plate with radiating sectors and count colonies in opposite sectors	149	91	----	2	18	----	1	12	----	4	8	----	60	24	----	9	14	----	4	3	----	21	4	----	17	3	----	31	5	----
25. Reporting counts—report as "standard plate count" per ml	86	51	11	11	1	----	7	3	----	5	2	----	29	14	11	5	6	----	5	1	----	----	4	----	7	9	----	17	11	----
Record which temperature used	108	21	262	----	----	29	----	20	----	----	----	32	55	----	53	13	18	16	----	----	19	8	2	22	10	1	27	13	----	43
Record kept of dilutions used	174	31	----	11	4	----	10	3	----	13	2	----	60	15	----	22	5	----	6	----	----	16	----	----	20	1	----	16	1	----
Of colonies on each plate counted	208	20	----	8	1	----	8	2	----	16	2	----	67	6	----	25	5	----	7	----	----	17	----	----	22	2	----	38	2	----
Multiply by proper factor	37	24	1	0	----	----	0	----	----	1	----	----	21	15	1	2	----	----	0	----	----	2	3	----	2	2	----	9	4	----
Use only two significant figures	182	23	1	20	2	----	7	5	----	14	2	----	49	6	1	25	4	----	9	----	----	13	1	----	16	2	----	29	1	----
Raise if figure dropped is 5 or more, lower if 4 or less	246	41	1	22	5	----	11	6	----	17	3	----	78	11	----	36	5	1	7	1	----	17	3	----	21	6	----	37	1	----
If plates developing less than 30 colonies must be used, report as "less than 3,000 per ml." if 1:100 dilution used, etc	245	28	120	----	----	29	----	----	20	----	----	32	99	6	6	32	13	12	----	7	12	19	1	7	38	1	1	57	----	1
If all plates show no growth report as unsatisfactory*	----	1	205	----	----	29	----	----	20	----	----	20	----	----	38	----	----	24	----	----	4	----	----	10	----	1	16	----	----	44
26. Control—if bacteria failing to grow are suspected, check by direct method or additional plates at suitable temperatures	10	121	200	----	29	----	----	20	----	----	32	----	2	----	70	8	17	17	----	19	----	----	3	26	----	----	36	----	1	50

* Indicates modification required by P. H. S. Milk Code. De=Deviations. Un=Undetermined. No=Not used.

TABLE 7.—*Milk laboratories surveyed, showing nature and conformance with Standard Methods*

Primary nature of laboratories	Total	Number conforming with Standard Methods in—					
		Apparatus	Preparation	Technique	Incubation	Counting	Reporting
State—							
Health Department	38	1	-------	-------	1	3	5
Agriculture Department	8	-------	-------	-------	-------	-------	2
Miscellaneous	13	-------	-------	-------	-------	2	1
Health Department, branch	30	-------	1	-------	-------	2	5
County—							
Health Department	45	-------	-------	-------	-------	2	2
Health Department, milk only	15	-------	-------	-------	-------	2	5
City—							
Health Department	126	-------	-------	-------	2	6	11
Health Department, milk only	71	-------	-------	-------	1	-------	2
Private—							
Clinical	20	-------	-------	-------	-------	-------	-------
Milk only	17	-------	-------	-------	-------	-------	1
Hospital	16	-------	-------	-------	-------	-------	-------
Total	399	1	1	0	4	17	34

Almost universally it was the intention to follow Standard Methods, and the laboratories considered that the procedures they demonstrated conformed to Standard Methods. When the actual requirements were explained in respect to the deviations noted, and the proper equipment, technique, or procedure was indicated or demonstrated, together with the reasons for such requirement, and where the probable inaccuracies of the local practice were pointed out, it was apparently the first time that a real understanding of certain requirements in Standard Methods had been obtained. Sometimes it was true that Standard Methods had not been consulted, no copy being available, or that only an earlier edition was on hand. Several 1934 editions, a very few 1929 editions, and once or twice a 1923 edition, were noted. On the other hand, individuals have been known to refer to Standard Methods and, after reading the various possibilities discussed there, to do just opposite to the interpretation placed on the material by the Standard Methods Committee itself. Having witnessed the incorrect performance of items by the individual workers, the author discussed with them the reasons for the requirements and left a copy of the survey form summarizing the actual requirements of Standard Methods. This should result in immediate improvement insofar as technique is concerned, at least in the elimination of faulty practices not dependent upon equipment. The recommendations on equipment which were written later focused attention on these deficiencies, placed them on record with the administrative officials, and indicated the basis for correction.

In size the laboratories varied from that used once per month or so for milk analysis to large general laboratories in metropolitan city health departments. In general the larger laboratories were better equipped, but not necessarily so. Similarly, their technique might be

expected to be above average, but in each of the largest laboratories visited, errors were made with a direct effect upon the accuracy of the results reported.

Few States have supervised laboratories within their area to any extent and various systems have been used by the several States doing this, ranging from voluntary action to supervision in accordance with an act of legislature. Various factors influenced the type of supervision, this probably being best where the State laboratory administrator himself visited laboratories periodically. However, such persons are usually not specialists in milk analysis, and while in general the supervised laboratories were rather uniform in equipment and procedures, vital details had been overlooked in regard to technique, and in selection of, or in reporting, results. In many States there is no reliable source of advice or consultation, and it would seem essential to foster such a service.

It is believed that the United States Public Health Service milk laboratory survey forms should be of value to administrators in improving the work of laboratories in their jurisdiction. Likewise, they should be useful as a guide to the worker in service and should be particularly helpful to those training new workers, inasmuch as this would give all workers something more tangible to follow than, for example, the 26-page discussion in Standard Methods on the agar plate method. The use of such forms should also result in the methods now standard actually being followed by laboratories—something which we assumed was being done but which obviously has not been completely practiced.

Considering the help that bacteriological examinations have given in the sanitary control of milk, and the errors of omission and commission in following Standard Methods as listed herein, it is evident that they may become even more useful in the sanitary control of milk when properly performed.

NOTE.—Part II, on direct microscopic counts and methylene blue reduction tests, and part III, on sampling and health department practice, will appear in early issues.

AN OUTBREAK OF DERMATITIS FROM HAIR LACQUER[1]

By LOUIS SCHWARTZ, *Medical Director, United States Public Health Service*

Hair lacquers are used by women to keep stray locks in place. When first manufactured, shellac dissolved in alcohol, or shellac treated with borax or with triethanolamine, was used. This was dissolved or emulsified with water. The lacquers are put up in liquid form or in the form

[1] From the Dermatoses Investigations Section, Division of Industrial Hygiene, National Institute of Health.

of pads moistened with the solution and packed in jars, each jar containing 100 pads.

Dermatitis has only rarely occurred following the use of hair lacquer made from real shellac, but when the supply of shellac began to diminish on account of the war, substitutes were used by the manufacturers. Manila gum was the first substitute but the supply of this also failed and cosmetic houses appealed to their shellac jobbers for an available substitute.

Two jobbers of shellac in Chicago were the main sources of supply for the shellac formerly used in hair lacquers in that section of the country. One of these jobbers sold as a substitute for shellac a synthetic resin which had been used as a shellac substitute for wood varnish.

The first lacquer pads went on the market in May 1943, and soon afterwards complaints of dermatitis began to come in to the manufacturer, both from actual users and from firms selling the pads. The dermatitis occurred at the back of the neck, around the ears, and on the forehead, wherever the lacquer touched the skin as the stray locks were smoothed into place with the wet lacquer pads.

The manufacturer of the lacquer pads had bought the powdered resin from the chemical jobber and manufactured his own lacquer solution in the following manner: 80 pounds of the resin were mixed with 18 pounds of caustic soda and 32 ounces of ammonium hydroxide and cooked together. Enough water was added to make 118 gallons. This gives a solution containing approximately 9 percent resin and 2 percent caustic alkali. The acid number of the resin which was used was about 225, and cooking it with the caustic alkali brought the pH of the solution up to 9.

Up to date, 51 letters of complaint have been received by this cosmetic house from stores selling the product. These complaints represent many times 51 cases because most of the letters report several cases of dermatitis. About 100,000 packages of this particular hair lacquer were sold to stores before the manufacturer became alarmed and called back all the unsold packages from the dealers.

Another cosmetic firm bought similar pads already prepared by a laboratory and soon after shipping them out to the dealers began to receive complaints of dermatitis from their product.

The other chemical jobber when called upon for a shellac substitute furnished a synthetic resin made by another large chemical company. But this jobber instead of furnishing the powdered resin actually dissolved it in isopropyl alcohol and sold the solution to the hair lacquer wholesaler. The lacquer wholesaler in turn diluted this with 20 percent water, added perfume and bottled it, and sold it to the retailers. This solution had a pH of 3. He also began to receive com-

plaints of dermatitis about 2 weeks after the first batch was put on the market. He, therefore, recalled the product and ceased making it.

The composition of the resins was ascertained by questioning the two chemical concerns, each of which made one of them. This revealed a most interesting coincidence, i. e., that both resins, although obtained from widely different sources, were combinations of rosin and maleic anhydride. They differed only in that one of them contained, in addition, ethylene glycol and that the other one, instead of actually using maleic anhydride to boil with the rosin, used fumaric acid which is isomeric with maleic anhydride and changes rapidly to maleic anhydride upon boiling.

The patch tests performed by the doctors upon their patients proved that the hair lacquers were the actual cause of the dermatitis. Patch tests performed on seven controls by the author, and left on for 24 hours, showed that the pads containing the alkali wrinkled and peeled the epithelium, but there were no reactions from the liquid hair lacquer. This shows that the dermatitis caused by the hair lacquers was due to sensitization rather than primary irritation.

Undoubtedly the synthetic resins consisting of a combination of the maleic anhydride and rosin were the actual cause of the dermatitis although the alkalinity of one of the products (pH 9) and the strong acidity of the other (pH 3) aided the penetration of the resin into the skin.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

September 12–October 9, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended October 9, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The number of cases of poliomyelitis dropped from 3,482 during the preceding 4 weeks to 3,032 during the 4 weeks ended October 9. While the highest peak of the current epidemic was reached during the first week of the period under consideration, with a total of 1,020 cases for the week, the number of cases dropped to 515 during the last week (ended October 9). Compared with preceding

years the incidence was the highest reported since 1931, when approximately 4,100 cases were recorded for this period. The number of cases was more than 3.5 times the 1942 figure and 1.6 times the preceding 5-year median.

Although decreases from the preceding 4-week period were reported from all regions except the New England, Middle and South Atlantic sections, some States in regions where the disease has been unusually prevalent still reported a relatively high incidence. States still reporting more than 75 cases for the 4 weeks are as follows: Illinois 557, Kansas 184, Massachusetts 105, Connecticut 103, New York 226, Iowa 78, Michigan 88, Texas 139, Colorado 95, Utah 125, Washington 98, Oregon 94, and California 414. The recent epidemic has appeared in all sections of the country except the South Atlantic and East South Central; in these regions the incidence has been somewhat below the normal seasonal expectancy.

Meningococcus meningitis.—A total of 696 cases of meningococcus meningitis was reported during the current 4-week period, as compared with 192 cases in 1942 and a 5-year median of 107 cases. For the country as a whole, as well as for each geographic region, the incidence was the highest for this period in the 15 years for which these data are available. There has been a gradual increase in this disease in practically all sections of the country since 1940, the incidence reaching a peak of approximately 2,400 cases for the 4 weeks ended April 24 of the present year, which was the largest number on record for any 4-week period. The incidence dropped to 650 cases for the 4 weeks ended September 11, which, as an increase is normally expected at this time of the year, will probably mark the lowest level for the current year; that number of cases was about 1.7 times the lowest 4-week incidence in 1929. For the first 40 weeks in 1929 there were approximately 8,300 cases reported, as compared with approximately 14,700 for the same weeks of the current year.

Influenza.—The number of cases of influenza rose from 2,233 during the preceding 4 weeks to 3,677 during the 4 weeks ended October 9. The incidence was only slightly above that reported during the corresponding period in 1942, but it was considerably above the 1938-42 median for this period. The increase was largely due to an excess of cases in the West South Central region, particularly in the State of Texas; more than 1,800 of the total cases (1,950) in the whole region occurred in that State. The New England, South Atlantic, and Mountain regions reported minor excesses over the medians, but in all other regions the incidence was relatively low.

Measles.—For the current 4-week period there were 4,388 cases of measles reported, the number being the highest during this period in the 15 years for which these data are available. The 1938–42 median

for this period was 2,816 cases. Each region of the country, except the East South Central and Pacific regions, contributed to the relatively high incidence. For the country as a whole, the number of cases was about 1.6 times the median, while the numbers of cases in the various regions ranged from 1.1 times the median in the West South Central region to more than 4 times the median in the West North Central region.

Number of reported cases of nine communicable diseases in the United States during the 4-week period September 12–October 9, 1943, the number for the corresponding period in 1942, and the median number of cases reported for the corresponding period, 1938–42

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,474	1,732	1,759	3,677	3,503	2,653	4,388	2,484	2,816
New England	25	36	30	18	9	9	417	286	286
Middle Atlantic	80	57	95	26	54	34	711	460	460
East North Central	143	120	161	111	222	222	1,465	391	506
West North Central	172	115	113	34	56	53	715	183	177
South Atlantic	486	697	707	1,013	1,225	936	296	124	151
East South Central	264	255	273	150	119	119	50	54	121
West South Central	178	298	294	1,950	1,369	591	124	67	110
Mountain	35	69	67	297	334	205	270	361	213
Pacific	91	85	85	78	115	101	340	558	558
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	696	192	107	3,032	855	1,844	6,232	5,165	5,165
New England	97	20	11	288	40	40	676	494	286
Middle Atlantic	169	52	28	304	186	186	905	859	816
East North Central	144	19	17	811	270	342	1,513	1,208	1,439
West North Central	42	10	9	430	127	127	752	534	534
South Atlantic	73	41	25	64	69	78	1,056	961	790
East South Central	44	11	11	27	41	41	377	494	474
West South Central	24	5	8	228	42	45	152	181	181
Mountain	19	5	4	274	34	34	251	149	172
Pacific	84	29	5	606	46	88	550	285	375
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	17	19	48	647	813	1,444	10,045	10,745	10,745
New England	0	0	0	39	49	31	886	1,285	861
Middle Atlantic	0	0	0	110	108	173	1,953	2,806	2,835
East North Central	8	6	9	85	109	158	2,898	3,328	3,328
West North Central	3	0	28	30	45	108	544	451	578
South Atlantic	1	3	1	133	150	273	1,348	835	1,160
East South Central	0	4	4	79	107	179	413	294	436
West South Central	4	4	4	90	152	339	594	434	434
Mountain	0	2	2	51	60	72	492	478	454
Pacific	1	0	2	30	33	52	917	834	834

[1] Mississippi, New York, and Pennsylvania excluded: New York City included.
[2] Mississippi excluded.

Scarlet fever.—The number of cases of scarlet fever rose from 3,255 during the preceding 4-week period to 6,232 for the current 4-week period. An increase of this disease is expected at this season of the year, but the current incidence represents a somewhat larger increase than normally occurs. The total cases for the country as a

whole were about 20 percent above the 1938–42 median and every region except the East and West South Central reported an excess of cases over the median.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases (1,474) of diphtheria reported for the 4 weeks ended October 9 was only about 80 percent of the 1938–42 median incidence for the corresponding period. The number of cases in the West North Central region was about 50 percent above the median and a few more cases than might normally be expected occurred in the Pacific region, but in all other regions the incidence was below the normal seasonal expectancy.

Smallpox.—For the current period there were 17 cases of this disease reported, as compared with 19 in 1942 and a median of 48 cases for the corresponding period in the 5 preceding years. The incidence was the lowest on record for this period.

Typhoid and paratyphoid fever.—The number of cases of typhoid and paratyphoid fever reported during the current 4-week period was the lowest on record for this period. The number of cases (647) was considerably below even the corresponding period of the preceding year when 813 cases were reported. The 1938–42 median for this period was 1,444 cases, the current incidence being less than one-half of that number. The incidence was below the median in all regions except the New England.

Whooping cough.—The number of cases of whooping cough reported for the 4 weeks ended October 9 was about normal for this season of the year. For the country as a whole the number of cases (10,045) was only slightly below the 1938–42 median. In five of the nine geographic regions the incidence was above the median and in four of the regions the incidence was relatively low.

MORTALITY, ALL CAUSES

For the 4 weeks ended October 9 there were approximately 33,000 deaths from all causes reported by the group of large cities to the Bureau of the Census. The number of deaths reported was about 5.2 percent more than the average for the corresponding weeks of the 3 preceding years.

The monthly death rate from all causes among persons in the industrial department of the Metropolitan Life Insurance Co. has been above the corresponding month of the preceding year for every month from October 1942 to August 1943, inclusive, the latest data available. The average of the excesses in the rates for these months over the corresponding months of the preceding year was 8.7 percent.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 23, 1943

Summary

The incidence of poliomyelitis declined for the fifth consecutive week. A total of 438 cases was reported, as compared with 484 for the preceding week and a 5-year (1938–42) median of 312 for the week. The cumulative total to date is 10,757 cases.

Currently, decreases were recorded for all of the geographic areas except the East North Central, Mountain, and Pacific. Slightly increased incidence was reported in a few States in these areas. The States reporting the largest numbers of cases are as follows (last week's figures in parentheses): California 84 (76), Illinois 57 (57), New York 39 (35), Oregon 36 (32), Washington 24 (28), and Kansas 22 (31). Only 7 other States reported more than 10 cases for the week.

Although the incidence of meningococcus meningitis declined during the week, it maintained a high level. A total of 224 cases was reported, as compared with 240 for the preceding week, 191 for the next earlier week, and a 5-year median of 37 for the corresponding week. Of the 224 cases reported currently, 181, or about 81 percent, were reported in the eastern States. A total of 15,178 cases has been reported to date.

Reports for the current week show that, in addition to poliomyelitis and meningococcus meningitis, the incidence of influenza, measles, and scarlet fever is above the median expectancy, while diphtheria, whooping cough, smallpox, and typhoid fever are below the expectancy, the latter two apparently establishing new low records.

A total of 130 cases of endemic typhus fever was reported during the week (48 in Georgia and 34 in Texas), as compared with 123 for the corresponding week last year. To date 3,479 cases have been reported, as compared with 2,902 for the same period last year.

Deaths recorded for the week in 89 large cities in the United States totaled 8,552, as compared with 8,582 last week and a 3-year (1940–42) average of 8,152. The cumulative figure to date is 379,677, as compared with 351,391 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended October 23, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria: Week ended— Oct. 23, 1943	Diphtheria: Week ended— Oct. 24, 1942	Diphtheria: Median 1938–42	Influenza: Week ended— Oct. 23, 1943	Influenza: Week ended— Oct. 24, 1942	Influenza: Median 1938–42	Measles: Week ended— Oct. 23, 1943	Measles: Week ended— Oct. 24, 1942	Measles: Median 1938–42	Meningitis, meningococcus: Week ended— Oct. 23, 1943	Meningitis, meningococcus: Week ended— Oct. 24, 1942	Meningitis, meningococcus: Median 1938–42
NEW ENGLAND												
Maine	1	1	0	------	------	------	43	7	31	4	2	1
New Hampshire	0	0	0	5	------	------	1	1	1	1	0	0
Vermont	0	0	0	------	------	------	20	66	7	1	0	0
Massachusetts	5	4	4	------	------	------	96	199	82	9	2	2
Rhode Island	0	2	1	------	------	------	23	0	1	8	1	0
Connecticut	0	2	1	2	3	1	6	10	10	4	2	0
MIDDLE ATLANTIC												
New York	8	17	17	[1] 6	[1] 12	[1] 6	125	93	93	38	16	2
New Jersey	1	3	4	3	8	5	125	24	22	12	2	0
Pennsylvania	9	11	12	2	1	------	66	105	110	13	5	5
EAST NORTH CENTRAL												
Ohio	6	21	21	1	6	3	167	22	14	12	2	1
Indiana	9	14	17	3	2	6	52	8	8	6	0	0
Illinois	7	18	20	6	6	6	16	11	13	8	3	3
Michigan [2]	12	10	10	------	1	------	257	35	35	12	0	0
Wisconsin	13	1	1	2	19	9	250	34	51	2	2	2
WEST NORTH CENTRAL												
Minnesota	10	3	4	1	------	1	228	14	10	4	0	0
Iowa	1	2	2	------	2	2	6	18	13	0	0	0
Missouri	1	7	11	2	------	------	4	3	5	7	0	0
North Dakota	4	1	1	2	7	7	155	1	1	1	0	0
South Dakota	9	7	1	------	------	------	2	4	4	0	0	0
Nebraska	0	0	3	1	3	------	3	36	4	0	0	0
Kansas	4	2	4	1	2	4	6	4	4	0	0	0
SOUTH ATLANTIC												
Delaware	0	2	1	------	------	------	3	0	0	1	0	0
Maryland [2]	6	5	7	2	3	3	5	4	4	7	7	1
District of Columbia	0	3	2	------	------	------	1	0	0	4	3	0
Virginia	22	53	53	155	138	104	78	4	6	10	1	1
West Virginia	9	7	12	5	10	15	18	2	2	3	1	1
North Carolina	29	83	101	4	2	2	15	3	73	6	0	0
South Carolina	28	85	34	303	272	209	52	3	3	2	0	0
Georgia	30	51	51	14	22	25	6	1	1	1	1	0
Florida	7	13	11	10	3	3	4	2	5	0	0	0
EAST SOUTH CENTRAL												
Kentucky	16	24	17	------	3	3	13	12	12	4	0	1
Tennessee	25	14	40	11	9	16	6	7	11	7	0	1
Alabama	32	29	29	51	39	38	5	3	3	5	1	1
Mississippi [2]	7	18	18	------	------	------	------	------	------	1	2	1
WEST SOUTH CENTRAL												
Arkansas	11	15	20	22	19	18	38	2	2	0	1	0
Louisiana	4	19	22	------	4	3	1	3	1	2	0	0
Oklahoma	6	9	13	12	15	30	1	2	2	4	0	0
Texas	49	56	48	734	414	231	35	3	14	3	0	1
MOUNTAIN												
Montana	0	0	1			14	55	3	13	0	0	0
Idaho	1	0	0	------	10	------	1	28	3	0	0	0
Wyoming	0	0	1	2	5	1	5	4	4	1	0	0
Colorado	4	17	9	10	24	16	11	8	19	0	0	0
New Mexico	0	0	1	1	1	1	3	7	7	1	0	0
Arizona	1	0	2	50	36	53	0	7	7	1	0	0
Utah [2]	0	0	0	------	3	3	4	101	4	0	0	0
Nevada	0	0	0	------	------	------	3	1	0	0	0	0
PACIFIC												
Washington	14	6	2	------	1	------	22	176	18	2	1	0
Oregon	1	4	1	11	9	9	15	80	13	5	1	0
California	36	17	22	13	29	18	45	40	98	12	5	1
Total	438	656	662	1,447	1,143	909	2,096	1,201	1,201	224	61	37
42 weeks	10,303	11,193	11,697	89,808	88,357	156,030	548,387	473,050	473,050	15,178	2,843	1,673

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 23, 1943, and comparison with corresponding week of 1942 and 5-year median—Continued

Division and State	Poliomyelitis: Week ended— Oct. 23, 1943	Poliomyelitis: Week ended— Oct. 24, 1942	Poliomyelitis: Median 1938–1942	Scarlet fever: Week ended— Oct. 23, 1943	Scarlet fever: Week ended— Oct. 24, 1942	Scarlet fever: Median 1938–42	Smallpox: Week ended— Oct. 23, 1943	Smallpox: Week ended— Oct. 24, 1942	Smallpox: Median 1938–42	Typhoid and paratyphoid fever [3]: Week ended— Oct. 23, 1943	Typhoid and paratyphoid fever [3]: Week ended— Oct. 24, 1942	Typhoid and paratyphoid fever [3]: Median 1938–42
NEW ENGLAND												
Maine	0	1	0	22	16	11	0	0	0	2	0	0
New Hampshire	1	3	0	4	7	6	0	0	0	0	0	0
Vermont	3	2	0	6	4	4	0	0	0	1	0	0
Massachusetts	17	3	3	163	169	74	0	0	0	5	2	2
Rhode Island	4	0	0	7	4	4	-----	0	0	0	0	0
Connecticut	8	0	0	33	26	23	0	0	0	1	0	0
MIDDLE ATLANTIC												
New York	39	9	13	191	131	123	0	0	0	11	15	14
New Jersey	0	9	9	97	46	54	0	0	0	5	2	2
Pennsylvania	7	5	7	147	114	122	0	0	0	2	10	17
EAST NORTH CENTRAL												
Ohio	13	10	10	266	156	156	0	0	0	10	28	12
Indiana	5	4	4	78	29	81	0	0	1	0	6	4
Illinois	57	20	16	97	148	156	0	0	1	6	11	9
Michigan [2]	11	5	11	126	63	147	0	0	0	3	2	3
Wisconsin	16	0	4	114	162	97	0	0	0	1	0	1
WEST NORTH CENTRAL												
Minnesota	7	4	11	74	57	53	0	0	1	0	0	0
Iowa	4	0	4	58	29	52	0	3	0	0	1	3
Missouri	1	5	1	39	85	65	0	3	1	1	0	5
North Dakota	1	1	1	10	6	11	0	0	0	2	0	2
South Dakota	1	0	1	10	12	18	0	0	0	0	0	0
Nebraska	2	8	2	11	13	13	0	1	1	0	0	0
Kansas	22	8	4	77	29	62	0	0	0	2	3	3
SOUTH ATLANTIC												
Delaware	0	2	0	5	5	5	0	0	0	0	1	1
Maryland [2]	0	1	2	25	37	35	0	0	0	1	5	8
District of Columbia	0	0	1	15	14	14	0	0	0	0	0	0
Virginia	2	0	5	42	63	38	0	0	0	6	5	10
West Virginia	1	0	3	104	56	64	0	2	0	1	7	7
North Carolina	0	3	5	146	116	93	0	0	0	1	12	6
South Carolina	0	8	0	13	32	13	0	0	0	0	3	3
Georgia	2	1	1	33	44	35	1	0	0	4	8	8
Florida	1	1	1	1	8	8	0	0	0	1	1	2
EAST SOUTH CENTRAL												
Kentucky	3	0	5	47	48	52	0	1	0	0	4	11
Tennessee	0	3	1	57	46	62	0	0	0	3	11	14
Alabama	0	2	2	24	47	47	0	0	0	1	2	2
Mississippi [2]	0	3	0	8	21	18	0	0	0	1	2	4
WEST SOUTH CENTRAL												
Arkansas	2	1	1	7	12	17	0	0	1	1	2	9
Louisiana	1	0	0	9	4	8	0	0	0	4	2	8
Oklahoma	9	2	2	8	26	23	0	0	1	4	5	5
Texas	16	13	7	47	42	40	0	3	0	15	10	21
MOUNTAIN												
Montana	0	0	0	20	8	14	0	0	0	0	0	1
Idaho	0	0	0	7	6	9	0	0	0	0	0	2
Wyoming	5	4	1	4	2	4	0	0	0	0	2	1
Colorado	17	2	2	14	22	27	0	0	1	4	3	3
New Mexico	3	0	1	8	2	8	0	0	0	10	6	6
Arizona	0	0	0	10	1	2	0	0	0	0	1	1
Utah [2]	13	1	2	14	3	6	0	0	0	1	1	0
Nevada	0	1	0	1	7	0	0	0	0	0	0	0
PACIFIC												
Washington	24	0	2	67	18	23	0	0	0	1	1	2
Oregon	36	1	3	28	8	13	0	3	1	1	0	0
California	84	19	10	116	85	89	0	0	0	9	3	5
Total	438	165	312	2,510	2,089	2,089	1	16	16	121	177	231
42 weeks	10,757	3,379	5,998	111,119	100,567	128,555	645	674	2,061	4,739	5,866	8,160

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 23, 1943, and comparison with corresponding week of 1942 and 5-year median—Continued

Division and State	Whooping cough, Week ended Oct. 23, 1943	Whooping cough, Week ended Oct. 24, 1942	Whooping cough, Median 1938-42	Week ended Oct. 23, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	12	57	48	0	0	0	0	0	0	0	0	0
New Hampshire	12	0	1	0	0	0	0	0	0	0	0	0
Vermont	27	34	34	0	0	0	0	0	0	0	0	0
Massachusetts	78	169	109	0	0	2	0	0	0	0	0	0
Rhode Island	31	21	19	0	0	0	0	0	0	0	0	0
Connecticut	37	81	81	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	234	330	329	0	1	55	0	3	1	0	0	0
New Jersey	104	134	134	0	1	1	0	0	0	0	0	0
Pennsylvania	126	331	297	2	0	1	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	143	165	165	0	0	0	2	0	0	0	1	0
Indiana	19	17	28	0	0	0	0	0	0	0	0	0
Illinois	105	161	161	0	0	2	0	0	0	0	0	1
Michigan [2]	212	231	231	0	0	11	0	0	0	0	0	0
Wisconsin	167	161	161	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	38	41	42	0	5	1	0	0	0	0	0	0
Iowa	35	24	15	0	1	0	0	1	0	0	0	0
Missouri	14	13	15	0	0	0	2	0	0	0	0	0
North Dakota	11	3	12	0	0	3	0	0	0	0	0	0
South Dakota	2	0	3	0	0	0	0	1	0	0	0	0
Nebraska	13	9	7	0	0	0	0	0	0	0	0	0
Kansas	33	24	26	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	11	3	0	0	0	0	0	0	0	0	0
Maryland [2]	44	62	37	0	0	0	10	1	0	0	0	0
District of Columbia	2	4	7	0	0	0	0	0	0	0	0	0
Virginia	106	24	24	0	0	0	91	0	0	1	1	1
West Virginia	22	12	16	0	0	0	0	0	0	0	0	0
North Carolina	113	57	99	0	1	1	0	0	0	0	0	3
South Carolina	50	25	25	0	0	0	0	0	0	0	0	11
Georgia	11	23	19	0	1	3	0	0	0	0	0	48
Florida	16	6	6	0	4	4	0	0	0	0	0	3
EAST SOUTH CENTRAL												
Kentucky	47	24	26	0	0	1	0	0	0	0	0	0
Tennessee	32	24	33	0	0	0	7	0	0	0	0	5
Alabama	16	29	14	0	0	0	0	0	0	0	0	14
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	2
WEST SOUTH CENTRAL												
Arkansas	18	29	15	0	0	25	0	0	0	0	0	0
Louisiana	0	2	8	0	1	0	0	0	0	0	1	6
Oklahoma	2	7	7	0	0	0	0	1	0	0	0	0
Texas	97	115	93	0	22	177	0	2	0	0	0	34
MOUNTAIN												
Montana	14	27	14	0	0	0	0	0	0	0	0	0
Idaho	9	1	1	0	0	0	0	0	0	0	0	0
Wyoming	4	5	3	0	0	0	0	0	0	0	0	0
Colorado	50	19	19	0	0	0	0	0	0	0	0	0
New Mexico	6	12	17	0	0	2	0	0	0	0	0	0
Arizona	7	2	9	0	0	0	12	0	0	0	0	0
Utah [2]	23	27	18	0	0	0	0	2	0	0	0	0
Nevada	11	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	47	14	24	0	0	0	0	0	0	0	0	0
Oregon	19	5	11	0	0	0	0	0	0	0	0	0
California	110	208	181	0	2	9	0	5	0	0	1	2
Total	2,329	2,780	2,807	2	39	299	124	17	1	1	4	130
42 weeks	154,651	147,130	147,861	53	1,746	13,705	3,581	586	23	422	674	3,479
42 weeks, 1942	------	------	------	68	974	10,629	5,806	466	39	441	743	2,902

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 4; New York, 4; Illinois, 1; Michigan, 1; Texas, 2; California, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 9, 1943

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	1	1	1	0	8	0	0	7
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	0	4	7	10	3	34	0	1	21
Fall River	0	0	------	0	0	0	4	2	2	0	0	3
Springfield	0	0	------	0	1	0	1	0	12	0	0	4
Worcester	0	0	------	0	0	0	7	0	14	0	0	2
Rhode Island:												
Providence	1	0	------	0	27	1	2	2	6	0	0	14
Connecticut:												
Bridgeport	0	0	------	0	0	3	0	3	3	0	0	1
Hartford	0	0	------	0	0	1	2	2	1	0	0	4
New Haven	0	0	------	0	0	0	1	0	5	0	0	0
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	3	2	3	1	3	0	0	6
New York	8	0	5	2	54	15	41	25	58	0	0	71
Rochester	0	0	------	0	2	3	5	1	1	0	1	14
Syracuse	0	0	------	0	0	0	2	2	2	0	1	24
New Jersey:												
Camden	1	0	1	1	1	0	2	0	1	0	0	0
Newark	0	0	------	0	1	3	3	0	6	0	0	14
Trenton	0	0	1	0	0	0	4	0	0	0	0	4
Pennsylvania:												
Philadelphia	1	0	------	0	2	3	9	1	15	0	0	38
Pittsburgh	0	0	1	0	20	4	20	0	15	0	0	12
Reading	0	0	------	0	0	0	0	0	0	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0	------	0	3	2	1	0	25	0	0	5
Cleveland	0	0	------	1	1	4	13	2	28	0	0	22
Columbus	0	0	------	0	3	0	1	0	12	0	1	11
Indiana:												
Fort Wayne	1	0	------	1	0	0	4	1	1	0	1	0
Indianapolis	1	0	------	1	1	2	11	0	10	0	0	14
South Bend	0	0	------	0	8	0	0	0	1	0	0	0
Terre Haute	0	0	------	0	0	0	2	0	1	0	0	1
Illinois:												
Chicago	1	0	2	0	6	13	19	46	27	0	0	59
Springfield	0	0	------	0	0	0	1	0	7	0	0	0
Michigan:												
Detroit	6	0	1	0	2	9	13	3	31	0	1	25
Flint	0	0	------	0	1	0	0	0	4	0	0	5
Grand Rapids	0	0	------	0	0	0	1	0	0	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	5	0	0	1
Milwaukee	0	0	1	1	1	0	5	2	41	0	0	46
Racine	0	0	------	0	0	0	0	0	5	0	0	3
Superior	0	0	------	0	89	0	0	0	0	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	3	0	1	0	8	0	0	17
Minneapolis	2	0	------	0	4	0	2	7	13	0	0	6
St. Paul	0	0	------	0	0	0	3	2	6	0	0	19
Missouri:												
Kansas City	0	0	------	0	0	2	10	2	14	0	0	2
St. Joseph	0	0	------	0	0	0	0	0	0	0	0	0
St. Louis	0	0	------	0	0	2	11	3	13	0	2	8
North Dakota:												
Fargo	0	0	------	0	2	0	0	0	0	0	0	0
Nebraska:												
Omaha	0	0	------	0	1	0	3	3	1	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	0	0	2	0	0	1
Wichita	0	0	1	0	0	0	0	0	1	0	0	5

City reports for week ended October 9, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	3	0	0	0	0	0
Maryland:												
Baltimore	1	0	------	0	6	2	12	1	7	0	0	41
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	1	1	4	2	13	0	0	17
Virginia:												
Lynchburg	0	0	------	0	4	0	1	0	1	0	1	9
Richmond	0	0	------	0	5	2	2	0	1	0	0	0
Roanoke	0	0	------	0	0	0	1	0	1	0	0	0
West Virginia:												
Charleston	0	0	------	0	1	0	0	0	1	0	0	0
Wheeling	0	0	------	0	0	2	1	0	2	0	2	0
North Carolina:												
Raleigh	0	0	------	0	0	0	1	0	0	0	0	0
Winston-Salem	1	0	------	0	0	0	0	0	5	0	0	4
South Carolina:												
Charleston	0	0	6	0	0	0	0	0	1	0	0	0
Georgia:												
Atlanta	0	0	3	0	1	0	1	0	0	0	0	0
Brunswick	1	0	------	0	0	0	3	0	2	0	0	0
Savannah	0	0	2	0	0	0	1	0	1	0	0	1
Florida:												
Tampa	0	0	------	0	0	0	4	0	0	0	0	1
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	0	0	2	0	2	0	1	8
Nashville	0	0	------	0	0	1	1	0	6	0	0	3
Alabama:												
Birmingham	1	0	------	0	2	0	8	0	1	0	0	1
Mobile	0	0	1	1	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	2	0	0	0	2	0	1	0	0	0
Louisiana:												
New Orleans	2	0	3	2	1	0	5	3	2	0	0	0
Texas:												
Dallas	1	0	1	1	0	1	0	3	0	0	0	0
Galveston	0	0	------	0	0	0	2	0	0	0	0	0
Houston	1	0	------	0	2	0	3	0	1	0	2	1
San Antonio	0	0	------	0	0	0	0	0	1	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	20	0	0	0	1	0	0	2
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	1	0	0	0	0	0
Idaho:												
Boise	1	0	------	0	0	0	0	0	1	0	0	0
Colorado:												
Denver	2	0	------	0	0	1	6	2	1	0	0	27
Pueblo	0	0	------	0	0	0	0	0	1	0	0	2
Utah:												
Salt Lake City	0	0	------	0	6	0	0	10	2	0	0	4
PACIFIC												
Washington:												
Seattle	3	0	------	1	7	1	1	10	2	0	0	12
Spokane	3	0	------	0	5	0	2	1	6	0	0	0
Tacoma	0	0	------	0	1	0	0	1	0	0	0	1
California:												
Los Angeles	4	0	2	1	6	2	0	13	15	0	1	16
Sacramento	0	1	------	0	1	0	2	1	2	0	0	2
San Francisco	0	0	1	1	4	3	7	7	29	0	3	13
Total	46	1	34	14	315	93	289	167	551	0	18	652
Corresponding week, 1942	85	4	72	24	224	29	297	53	533	0	29	980
Average, 1938-42	90	------	60	[1] 12	[2] 205	------	[1] 260	------	426	1	39	1,046

[1] 3-year average, 1940-42.
[2] 5-year median.

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: New York, 1.
Dysentery, bacillary.—Cases: Buffalo, 16; New York, 5; Rochester, 1; Chicago, 3; Springfield, 1; Detroit, 11; St. Louis, 2; Baltimore, 2; Atlanta, 1; Nashville, 1; Los Angeles 3.
Dysentery, unspecified.—Cases: Baltimore, 1; Richmond, 3; San Antonio, 2.
Typhus fever.—Cases: New York, 1; Savannah, 3; Birmingham, 2; Mobile, 1; New Orleans, 7; Dallas, 3.

Rates (annual basis) per 100,000 population by geographic groups, for the 88 cities in the preceding table (estimated population, 1942, 34,624,300)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	5.0	0.0	0.0	0.0	82.0	32.3	69.6	29.8	211.2	0.0	2.5	139
Middle Atlantic	4.5	0.0	3.6	1.3	37.0	13.4	39.7	13.4	45.0	0.0	0.9	82
East North Central	6.4	0.0	2.3	2.3	67.2	17.5	41.5	31.5	115.6	0.0	1.8	113
West North Central	3.9	0.0	2.0	0.0	19.5	7.8	58.6	33.2	113.3	0.0	3.9	113
South Atlantic	5.1	0.0	18.8	0.0	32.5	12.0	58.1	5.1	59.8	0.0	5.1	125
East South Central	5.9	0.0	5.9	5.9	11.9	5.9	35.6	0.0	53.5	0.0	5.9	42
West South Central	12.5	0.0	18.7	9.3	9.3	3.1	37.4	18.7	15.6	0.0	6.2	6
Mountain	24.1	0.0	0.0	0.0	209.0	8.0	56.3	96.5	48.2	0.0	0.0	281
Pacific	17.5	1.7	5.2	5.2	41.9	10.5	21.0	57.7	94.4	0.0	7.0	77
Total	6.9	0.2	5.1	2.1	47.4	14.0	43.5	25.1	83.0	0.0	2.7	98

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in fleas from rodents collected in California and submitted to the laboratory on dates given, as follows:

Eldorado County.—August 27, 54 fleas from 4 ground squirrels, *C. beecheyi*, and 7 fleas from 3 chipmunks taken at Tallac, Lake Tahoe; September 20, 57 fleas from 23 golden mantled ground squirrels from the Eldorado National Forest, Al Tahoe, Lake Tahoe, and 39 fleas from 2 tamarack squirrels taken 2 miles north of Tallac.

Placer County.—September 24, 11 fleas from 1 ground squirrel, *C. beecheyi*, taken at Carnelian Bay, Lake Tahoe.

San Diego County.—August 27, 326 fleas from 44 ground squirrels, *C. fisheri*, from a ranch 1 mile east and 3 miles south of Julian.

Santa Clara County.—August 31, 204 fleas from 7 ground squirrels, *C. beecheyi*, taken from property near Mayfield, 1¾ miles south of Highway No. 101.

TERRITORIES AND POSSESSIONS

Virgin Islands of the United States

Notifiable diseases—July–September 1943.—During the months of July, August, and September 1943, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	July	August	September	Disease	July	August	September
Filariasis	5	21	3	Schistosomiasis	2		1
Gonorrhea	33	11	8	Syphilis	20	27	16
Hookworm disease	5	3	4	Tuberculosis		2	
Malaria	1	2		Typhoid fever			1
Mumps	2			Typhus fever	1		
Pneumonia (all forms)	2	1		Whooping cough	20	3	

Panama Canal Zone

Notifiable diseases—August 1943.—During the month of August 1943, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	2		4		5		9		20	
Diphtheria	2						4	1	6	1
Dysentery (amebic)	1		1		1		4		7	
Dysentery (bacillary)	1						1		2	
Leprosy			1						1	
Malaria [1]	16		2		160		76		254	
Measles					1		1		2	
Mumps	28		27		69		9		133	
Paratyphoid fever	1				1		2		4	
Pneumonia		13		6	18			8	[2] 18	27
Scarlet fever			1						1	
Tuberculosis		21		6	4	3		7	[2] 4	37
Typhoid fever	2						5		7	
Whooping cough		1			1				[2] 1	1

[1] 77 recurrent cases.
[2] Cases reported in the Canal Zone only.

DEATHS DURING WEEK ENDED OCTOBER 16, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 16, 1943	Corresponding week, 1942
Data for 88 large cities of the United States:		
Total deaths	8,560	8,274
Average for 3 prior years	7,854	
Total deaths, first 41 weeks of year	369,911	341,798
Deaths under 1 year of age	643	613
Average for 3 prior years	559	
Deaths under 1 year of age, first 41 weeks of year	26,581	23,423
Data from industrial insurance companies:		
Policies in force	65,934,354	65,158,126
Number of death claims	10,319	8,849
Death claims per 1,000 policies in force, annual rate	8.2	7.1
Death claims per 1,000 policies, first 41 weeks of year, annual rate	9.7	9.1

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 25, 1943.—During the week ended September 25, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		3	5	31	26	14	18	13	28	138
Diphtheria	3	18	2	32		1		1		57
Dysentery, bacillary				1		1				2
Encephalitis, infectious						1				1
German measles				9	5			1	5	20
Influenza		2	7		19				2	30
Measles		4		119	59	16	4	14	32	248
Meningitis, meningococcus			3		5		2			10
Mumps		5	1	13	54	14	9	14	35	145
Poliomyelitis	1		1	13	7	6	8	2		38
Scarlet fever		10	5	79	45	16	15	20	15	205
Tuberculosis (all forms)		2	3	70	51	22		2	30	180
Typhoid and paratyphoid fever			3	8	2			2		15
Undulant fever					1					1
Whooping cough		4		125	148	23	13	42	15	370

CUBA

Habana—Communicable diseases—4 weeks ended September 18, 1943.—During the 4 weeks ended September 18, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	24	3	Paratyphoid fever	1	
Leprosy	1		Scarlet fever	1	
Lethargic encephalitis	1	1	Tuberculosis	7	
Malaria	1		Typhoid fever	44	10
Measles	7				

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–July 1943	August 1943	September 1943—week ended— 4	11	18	25
ASIA							
Ceylon	C	50					
China: Kwangsi Province [1]	C	394					
India	C	146,812	38,426				
Bombay	C	3	11	1	1		
Calcutta	C	3,346	564	256	207	343	
Chittagong	C	135	98		1	5	
Cochin	C	99	90		3		
Madras	C	974	14		11	2	
Negapatam	C	21					
Vizagapatam	C	13	48	1		1	
India (French)	C	55					
Chandernagor	C	8					
Karikal	C	30					
Pondichery	C	17					

[1] A report dated September 23, 1943, states that up to September 8, 1,100 cases of cholera with a mortality rate of over 25 percent have been reported in the Kweilin area of Kwangsi Province, China.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		January–July 1943	August 1943	September 1943—week ended— 4	11	18	25
AFRICA							
Basutoland [1]	C	11					
Belgian Congo—Plague-infected rats		P					
British East Africa:							
Kenya	C	14					
Uganda	C	14	4				
Egypt: Port Said	C	3	3				
Madagascar	C	40					
Morocco (French)	C	232	6				
Senegal	C	234	6				
Dakar	C	27	4				
Union of South Africa	C	53			5		
ASIA							
India	C	1,731	596	151	14		
Indochina	C	20	3				
Palestine	C	12					
SOUTH AMERICA							
Peru:							
Lambayeque Department	C	2					
Libertad Department	C	15					
Lima Department	C	3	6				
Lima	C	1					
Plague-infected rats		P					
Piura Department	C	2					
Venezuela	C	10					
OCEANIA							
Hawaii Territory:							
Hamakua District	D	4	1				
Plague-infected rats		[2] 69	[3] 4				

[1] For the period June 12–30, 1943, pneumonic plague occurred in a village near Mafeteng, Basutoland, all cases being fatal.
[2] Includes 3 plague-infected mice.
[3] Includes 1 plague-infected mouse.

SMALLPOX

[C indicates cases, D, deaths]

Place		January–July 1943	August 1943	September 1943—week ended—			
				4	11	18	25
AFRICA							
Algeria	C	833	117			[1] 108	
Angola	C	594					
Basutoland	C	38					
Belgian Congo	C	1,998	409	167	117		
British East Africa:							
Kenya	C	709	335	104	66	108	
Mombasa	C	3					
Tanganyika	C	11	13		1		
Dahomey	C	139					
Egypt	C	1,657	612	123	132	189	135
French Guinea	C	273	53				
Gold Coast	C	15	1				
Ivory Coast	C	141	3				
Mauritania	C	10	4				
Morocco (French)	C	754	60				
Mozambique	C	1					
Nigeria	C	4,228	239		48	104	
Niger Territory	C	178	14				
Senegal	C	60	8				
Sierra Leone	C	3					
Sudan (French)	C	3,219	181				
Union of South Africa	C	232	8	1			
ASIA							
Arabia	C	1					
Ceylon	C	2	38	15			
India	C	27,680	3,870	606			
India (French)	C	10					
Indochina	C	3,977	140				
Iran	C	496					
Iraq	C	193	1				
Palestine	C	101					
Syria and Lebanon	C	898	44	17	7		
Trans-Jordan	C	17					
EUROPE							
Belgium	C	1					
France	C	2					
Germany	C	1					
Gibraltar	C		1				
Portugal	C	37	3				
Scotland	C	1					
Spain	C	199	1				
Switzerland	C	7					
Turkey	C	7,082	555				
NORTH AMERICA							
Canada	C	4	2				
Guatemala	C	26					
Mexico	C	250	33				
SOUTH AMERICA							
Brazil	C	41	1				1
British Guiana	C	1					
Colombia	C	259		6	10		
Ecuador	C	13		2			
Peru	D	11	1				
Venezuela	C	53					

[1] For the period Sept. 1–20, 1943.

TYPHUS FEVER

[C indicates cases]

Place		January–July 1943	August 1943	September 1943—week ended—			
				4	11	18	25
AFRICA							
Algeria	C	7,804	215			[1] 68	
Belgian Congo	C	8	12				
British East Africa:							
Kenya	C	6	1				
Mombasa	C	1					
Uganda	C	1					
Egypt	C	38,186	1,038	99	95	59	55
Gold Coast	C	7	2				

[1] For the period Sept. 1–20, 1943.

TYPHUS FEVER—Continued

[C indicates cases]

Place		January–July 1943	August 1943	September 1943—week ended—			
				4	11	18	25
AFRICA—continued							
Morocco (French)	C	13,334	155				
Morocco (Spanish)	C	65					
Nigeria	C	8	1				
Rhodesia, northern	C	8		2			
Senegal	C	2					
Dakar	C		10				
Sierra Leone	C	3					
Tunisia	C	50					
Union of South Africa	C	782	5		4		
ASIA							
Afghanistan	C	520					
China: Shanghai	C	12					
India	C	1,061	2	1			
Iran	C	8,643					
Iraq	C	1,417	2				
Palestine	C	228	12	5	11	1	9
Syria and Lebanon	C	73	6		1		
Trans-Jordan	C	12					
EUROPE							
Bulgaria	C	1,250	61				
France—Seine Department	C	2					
Germany	C	[2] 973					
Hungary	C	692	24	6	3	2	
Irish Free State	C	19					
Portugal	C	7	1				
Rumania	C	6,665	188	36	23	25	23
Slovakia	C	366	54	9		12	
Spain	C	538	19				
Turkey	C	3,673	206				
NORTH AMERICA							
Guatemala	C	659	164				
Jamaica	C	13	3	3	2	3	
Mexico	C	780	68	5	3	2	3
Puerto Rico	C	2					
SOUTH AMERICA							
Brazil	C		1				
Chile	C	167	15	5	2		
Ecuador	C	220	9				[3] 17
Peru	C	9	3				
Venezuela	C	12					
OCEANIA							
Australia	C	74	7	1			
Hawaii Territory	C	11					

[2] For the period Jan. 1 to Apr. 30, 1943.
[3] For the month of September 1943.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January–July 1943	August 1943	September 1943—week ended—			
				4	11	18	25
AFRICA							
Belgian Congo:							
Bondo	D	1	1				
Kinzao	D	1					
Leopoldville	C	1	1				
Stanleyville	D	1					
Yanonge	C	1					
Dahomey: Natitingou	C		[1] 1				
Senegal: Kolda	C						1
SOUTH AMERICA							
Brazil: Para State	D	1					
Colombia:							
Cundinamarca Department	D	3					
Intendencia of Meta	D	2					

[1] Suspected.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON: 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 NOVEMBER 5, 1943 NUMBER 45

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U.S. PUBLIC HEALTH SERVICE
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Public Health Reports

Vol. 58 • NOVEMBER 5, 1943 • *No. 45*

SURVEYS OF MILK LABORATORIES IN WAR AREAS IN THE UNITED STATES [1]

II. PRACTICES OBSERVED IN MAKING DIRECT MICROSCOPIC EXAMINATIONS AND METHYLENE BLUE REDUCTION TESTS

By LUTHER A. BLACK, *Senior Bacteriologist, United States Public Health Service*

In a preceding paper (*1*) a summary was presented of the milk laboratory surveys made in the entire 48 States, with an analysis of the deviations observed in the 399 of the 408 laboratories surveyed which used the agar plate method. The general plan of procedure, forms used, and extent of the survey were discussed there. In this paper observations made of the direct microscopic method (Breed's method) and the methylene blue reduction test will be discussed. Relatively little use was made of these tests, even for analysis of samples of raw milk for pasteurization, as was shown in table 1 of the preceding paper. Only 38 laboratories employed the direct microscopic method, and only 61 used the methylene blue reduction test. This is considered fortunate inasmuch as these tests are considerably less accurate than bacterial plate counts, particularly when the sanitary quality of the local milk supply has been improved to the extent now attained in many localities.

Table 1 also showed that none of the 33 official laboratories surveyed in the four West South Central States or the 58 laboratories in the three Pacific States used the direct microscopic method for the examination of milk. On the other hand, none of the 30 official laboratories surveyed in the six New England States or the 20 laboratories in the three Middle Atlantic States used the methylene blue reduction test.

It should not be necessary to point out the greater accuracy of the agar plate method as this is generally agreed upon by competent and experienced bacteriologists. The vast majority of official laboratories using this procedure do not feel called upon to defend their choice. Those attending recent meetings and reading recent papers in certain journals, however, might be led to believe that the agar plate count has been superseded in accuracy by other rapid methods. This flurry

[1] From the Sanitation Section, States Relations Division.

apparently is due to a few individuals and is not even representative of any given group of States. It would seem to be aimed at displacing the more accurate agar plate method now in use in most laboratories by rougher methods, the result of which might well be that milk not now meeting Grade A bacterial standards would then pass the rougher standards and purportedly be of the highest grade.

While the proponents of these changes may be unprejudiced, such changes in applications of methods should be made upon their own merits and not under the pretext of a shortage of agar for bacteriological purposes.[3] Furthermore it is incumbent upon the advocates of such changes to present unbiased and convincing proof of their views—something which has not yet been done. Accordingly, while it is not necessary to defend the relative accuracy of the agar plate method, since the preceding paper (*1*) has dwelt at length upon the common failure to comply fully with the requirements of Standard Methods for the Examination of Dairy Products pertaining to the agar plate count, some may have construed the findings to mean that the method is not satisfactory. It should be pointed out that the deviations reported were those found at the time of the survey, and reports and observations indicate that many of the errors observed were corrected shortly thereafter.

A similar detailed analysis of the deviations observed has been prepared for the direct microscopic method and the methylene blue reduction test. These results are not as comprehensive as those reported for the agar plate count, partly because of the smaller number using such procedures, and partly because controls such as are required for the agar plate count were never included in these rougher tests, as, indeed, they need not have been when used for the purpose for which intended, namely, as estimates of bacteria present in raw milk, particularly that of lower quality. However, when individuals advocate the use of such rough tests as the sole bacteriological control not only of raw milk but even of pasteurized milk, it seems desirable not only to discuss observations of the tests as performed in the laboratories surveyed but also to summarize the investigations of others in comparative studies of these procedures.

Of the 408 official bacteriological milk laboratories surveyed in the 48 States and the District of Columbia, 399 used the agar plate method. Of these, 33 also used the direct microscopic examination and 57 used the methylene blue reduction method for samples of producers' milk. In addition, 4 laboratories surveyed used the direct microscopic method and 2 laboratories used the methylene blue

[3] Information available in 1942 was that while agar could be used only by bacteriological laboratories, under General Preference Order M-96 (Feb. 9, 1942), the supply was adequate for this purpose, and the War Production Board stated no further restrictions were contemplated. Present information (May 1943) is that no further restrictions have been made or are contemplated at this time.

reduction test (with one additional place purportedly using both procedures) as the sole procedure in the control of retail pasteurized and raw milk. Compilations were made of the number of laboratories conforming to, and deviating from, each subitem of equipment, preparation, technique, and reporting required by Standard Methods.

In the interest of clarity, the figures presented in the following tables list only deviations, items undetermined because of local conditions at the time of the survey, or items not used in the particular laboratory. Thus, at a glance one may single out common deviations, and some of these will be discussed briefly. The entire survey form has been divided into portions, and the material arranged so the results could be tabulated. The last 59 of the 92 laboratories reported upon (7 of which used both tests) were recorded on the revised forms and, in preparing the tables, the results of the first 33 laboratories recorded on the earlier form were also tabulated upon the present forms. This resulted, in some instances, in unduly large figures for items marked *undetermined,* where such an item was not included on the original forms. Likewise, the earlier surveys were based on the seventh edition of Standard Methods while the revised forms, based on the eighth edition, included a few additional items. Consequently, these additional items were marked *not used* when the results of the earlier surveys were transferred to the revised forms.

DIRECT MICROSCOPIC COUNT

The requirements of Standard Methods pertaining to apparatus and preparation under the direct microscopic method, and a summary of the survey results showing the deviations from Standard Methods, are presented in table 1 by geographic divisions with the totals for all States.

Of the 38 laboratories using this method, 29 used the correct pipettes, most of the others using loops, usually a standard loop but sometimes an ordinary bacteriological loop. In general, the apparatus (guides, slides, microscope, and microscope lamp) were purchased for this work and were suitable. There were 25 laboratories in which ocular discs were used; however, 11 laboratories did not use mechanical stages. The item pertaining to the binocular was not present on the original form, thus accounting for the larger number recorded in the *undetermined* column.

With regard to preparation, the stains generally met the requirements, sometimes being purchased ready for use. It was evident in more instances than shown that the microscopic factors in use may have been incorrect but no facilities were available for checking their accuracy. It was generally true that the laboratories did not fill

TABLE 1.—*Summary of items pertaining to apparatus and preparation used in direct microscopic count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			Mountain		
Number of laboratories surveyed	38			6			6			7			7			8			1			3		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
4. Pipettes—0.01 ml. A. P. H. A. specifications or accurately calibrated, tips unbroken*	8	1		1			1			5			1				1		0			0		
5. Guides—Glass or cardboard, square or round 1 sq. cm. areas	3			0			0			2			1			0			0			0		
6. Slides—Permit legible and indelible labeling	1	1		0			0			0			1	1		0			0			0		
7. Microscope—Equipped 1.8 mm. oil immersion objective	0			0			0			0			0			0			0			0		
Rack and pinion substage		1		0			0			0			0				1		0			0		
Condenser with iris diaphragm	0			0			0			0			0			0			0			0		
Ocular or oculars permitting adjustment of draw tube to field of desired diameter			1	0			0			0					1	0			0			0		
When accurate counts are desired, use ocular diaphragm or micrometer disc to limit field examined to desired size	2	2	9		1		0				1				6	1		1	0			1		2
Use special mechanical stage with 2 x 4½-inch slides	4	1	6	0			0			1	1		1		5	0			0			2		1
Binocular if many samples		12	7	0				4			7				5			1		1				1
And oculars adjusted or counts corrected		14	7	0				4			7				5		2	1		1				1
8. Illumination—Standard microscope lamp or equivalent artificial light source		1		0			0			0			0			0			0				1	
9. Stains—Certified stains used	1	1		0			0			0				1		1			0			0		
Chemicals of highest purity	0			0			0			0			0			0			0			0		
Correct formula	1	2		0			0			0			1				2		0			0		
Avoid use of old stains or those containing suspended matter		1		0			0			0				1		0			0			0		
Protect solvents, fixatives, and stains not in use by covering or stoppering containers		1		0			0			0				1		0			0			0		
Use fresh solutions whenever old ones are unfit		1		0			0			0				1		0			0			0		
Do not use as fat solvents those used previously to remove immersion oil	0			0			0			0			0			0			0			0		
10. Microscope—Illumination: tube length adjusted to permit maximum optical resolution		1	1	0			0			0				1				1	0			0		
Used in such position		2		0			0			0				1			1		0			0		
Light source adjusted for maximum optical resolution	0			0			0			0			0			0			0			0		
Field areas: diameter of field determined with stage micrometer	2	1			1		0			0			1			1			0			0		
Area determined and microscopic factor computed	2	1		0			0			1	1		0			1			0			0		
11. Pipettes—Filled with a cleaning solution after use	11	9	1	3	1		1	3		2	4		1	1		3		1	1			0		
Stored in a cleaning solution	20	8	1	3	1		1	3		2	4		6			5		1	1			2		
12. Slides—Physically clean	0			0			0			0			0			0			0			0		
13. Films—Guide plate used	2			0			0			1			1			0			0			0		
Each space identified with number or symbol corresponding to sample			2	0			0			0					2	0			0			0		

*Calibrated loop permitted but not for official control. De=Deviations. Un=Undetermined. No=Not used.

the pipettes with cleaning solution following use, and only one laboratory is recalled in which pipettes were regularly stored in such solution as prescribed by Standard Methods.

The requirements pertaining to procedure used in the direct microscopic method, and a summary of the deviations observed, are shown in table 2. The usual deviations in shaking samples already reported for the agar plate count were also observed in laboratories using the direct microscopic method. Frequent deviations were noted in measurement of the sample, in failure to rinse pipettes in the milk sample prior to measurement and in carelessness in manipulation of milk in or on the capillary pipette. Laboratories using loops for measurement naturally deviated from the 0.01 ml. portion prescribed for official counts. There was common failure to spread the amount carefully, and other deviations in handling and drying the films.

Most laboratories did not use this procedure for cream samples at the time of the surveys, and the procedure listed on the revised form appeared in the eighth edition only, thus accounting for larger numbers in the *not used* column for those details.

Staining of the preparations seemed well done, the majority of the laboratories using a one-solution technique. However, there was common failure to count the number of fields prescribed by Standard Methods, some errors in multiplication were noted, and frequently there was failure to preserve the microscopic preparations as required by Standard Methods. In most laboratories there was no second technician to check results; this probably accounted for some of the long-continued more serious errors observed in certain instances. Reports sometimes failed to show whether individual bacteria or clumps were recorded, and the results were frequently reported with several significant figures implying fictitious accuracy of the results.

METHYLENE BLUE REDUCTION TEST

The requirements of Standard Methods pertaining to the methylene blue reduction method, and a summary of the deviations observed, are presented in table 3.

In general the apparatus used by the laboratories employing this test had been purchased for this method, but some was improvised and much of it older types, one-third of the laboratories not having a thermostatically controlled water-bath or incubator. About 40 percent did not use solid stoppers or leakproof closures, but instead used cotton plugs or more frequently no closure at all.

With regard to preparation, over 25 percent of the laboratories were not using the prescribed methylene blue thiocyanate tablets, standard now through the last two editions of Standard Methods. Such solutions themselves were usually not stored as prescribed, as noted

Table 2.—*Summary of items pertaining to procedure used in direct microscopic count, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			Mountain		
Number of laboratories surveyed	38			6			6			7			7			8			1			3		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
14. Sample agitation—agitate vigorously	0			0			0				1		0			0			0			0		
Mix thoroughly	0			0			0				1		0			0			0			0		
Immediately before removing portion	0			0			0				1		0			0			0			0		
Before opening container remove all material from closure which may contaminate sample		4		0			0				1			2		0			0				1	
Wholesale and process samples: shake 25 times	1	7	6	0			0				4				4	1	2	2	0				1	
Up and down excursion	9	9	6	1	2		2	1		3	4		1		4	1	2	2	0			1		
About a foot	11	12	6	1	4		1	2		2	4		2		4	2	2	2	0			3		
Within 7 seconds	2	7	6		1		0			2	3			1	4		2	2	0			0		
15. Sample measurement—use aseptic technique	0			0			0			0			0			0			0			0		
Rinse bore of pipette thoroughly in fresh warm (40°–45° C.), clean water between samples		8	2		1			2			5		0					2	0			0		
Rinse bore in subsequent milk sample	3	10	2	1	1			2			5		2	2				2	0			0		
Draw sample into pipette above graduation mark		8	1		1			2			5		0					1	0			0		
Use clean towel to wipe exterior of pipette	2	10	1		1			2			5		1	1		1		1	0				1	
And absorb milk at tip to reduce column to graduation	2	10	1		1			2			5		1	1		1	1	1	0			0		
16. Making films—completely deposit 0.01 ml. in proper place on clean slide	6	4		1			1	1		3	1		1				1		0				1	
Spread liquid over exact sq. cm. area with point of bent needle	14	1		0				1		4			6			3			0			1		
Needle cleaned by wiping with clean cloth between samples (or flamed)		8	3	0			0				5				3		1		0			0		
Work rapidly to prevent bacterial growth while making films		1		0			0			0				1		0			0			0		
Film dried in warm place upon level surface protected from dust and insects		5			1		0				1			2		0			0				1	
Dried completely within 5 minutes	2	6		0			0				2		1	3		1			0				1	
Not heated so rapidly—preparation cracks or peels			1	0			0			0					1	0			0			0		
Cream- free from air bubbles		22	12		6			5			5			1	6		4	3		1				3
Dissolve all fat out of film (double treatment xylene, drying after each)	1	5	32			6			6			7	1		6		5	3			1			3
Treat film with alcohol and dry so as to flatten until thin and transparent before staining (double treatment alcohol, drying after each)	1	5	32			6			6			7	1		6		5	3			1			3
Renew xylene frequently		5	32			6			6			7		1	6		4	3			1			3

17. Staining films—(*a*) dip in suitable fat solvent for sufficient time, drain, dry, immerse in suitable alcohol for 1 to 2 minutes, dry, dip in staining solution for sufficient time, rinse (decolorize in alcohol if overstained), dry thoroughly; or (*b*) dip in combined solvent, fixing and staining solution for sufficient time, remove, dry thoroughly, dip in water to remove excess stain	1	1	----	----	1	----	0	----	----	0	----	----	1	----	----	0	----	----	0	----	----	0	----	----
18. Counting films—place proper ocular diaphragms or micrometer discs in proper oculars to obtain suitable field diameters	1	1	6	----	1	----	0	----	----	0	----	----	----	----	4	1	----	----	0	----	----	----	----	2
Use immersion oil between slide and objective	1	----	----	0	----	----	0	----	----	0	----	----	0	----	----	1	----	----	0	----	----	0	----	----
Count the bacteria in not less than the number of fields specified by Standard Methods	11	17	----	5	1	----	----	6	----	3	1	----	1	4	----	1	2	----	1	----	----	----	3	----
Determine the average number of bacteria per field	1	1	----	0	----	----	0	----	----	----	1	----	0	----	----	1	----	----	0	----	----	0	----	----
Multiply by the proper factor for the estimated number of bacteria or clumps per ml	2	2	----	0	----	----	0	----	----	1	1	----	1	----	----	----	1	----	0	----	----	0	----	----
Preserve microscopic preparations for a reasonable interval after official reports are rendered	8	5	----	2	----	----	----	1	----	4	----	----	----	2	----	1	----	----	0	----	----	1	2	----
At intervals have a second technician check results	4	17	3	----	5	----	----	1	----	----	4	----	1	2	3	3	1	----	----	1	----	----	3	----
19. Reporting counts—report as estimated number of individual bacteria or clumps per ml	1	1	1	0	----	----	0	----	----	----	1	----	----	----	1	1	----	----	0	----	----	0	----	----
Use only 2 significant figures	7	5	----	1	2	----	0	----	----	----	1	----	3	2	----	2	----	----	0	----	----	1	----	----
Raise if figure dropped is 5 or more; lower if 4 or less	9	12	----	1	3	----	----	1	----	----	1	----	3	3	----	4	3	----	0	----	----	1	1	----

De=Deviations. Un=Undetermined. No=Not used.

TABLE 3.—*Summary of items pertaining to apparatus, preparation, and procedure used in methylene blue reduction test, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories surveyed	61			9			26			14			1			7			3			1		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
4. Pipette—straight-sided graduated to deliver 10 ml. or dipper calibrated to deliver 10 ml	1		1	0			1			0			0					1	0			0		
5. Burette—graduated, or pipette graduated to deliver 1 ml	1			0			1			0			0			0			0			0		
6. Tubes—without lip, 150 mm. × 12–15 mm., rubber stoppers to fit (or leakproof closures)	24	1		5			9	1		6			0			2			2			0		
7. Tube racks—rust-resistant metal, single or double rows, hold tubes in vertical position	7	10			2		5	2		1	3		0			1	2		0				1	
8. Water bath or incubator—thermostatically controlled at 37° C.± 0.5 C°	13	6		1			8	2		2	1		0			2	1			1			1	
9. Stains—use only methylene blue thiocyanate tablets, certified suitable for reduction	15	4		2	1		6	2		3			1			1			2				1	
Dissolve one tablet (over night if necessary) in 200 ml. of sterile or freshly boiled distilled water	1	5			3			1		0				1		0			1			0		
Aqueous solution protected from light by storage in amber bottles in dark	25	8	5	4	1		11	5	3	6		1	0			1	2	1	3			0		
Use fresh solutions whenever old has deteriorated		2		0				1		0			0				1		0			0		
10. Equipment—glassware scrupulously clean	1			0			1			0			0			0			0			0		
Free from etching	1			0			1			0			0			0			0			0		
Containers for dye solution, pipettes, test tubes, and rubber stoppers sterilized, or boiled immediately before use (allowing retained heat to dry equipment)	10	1	1	2			4		1	3			0			1	1		0			0		
11. Identification—identify each tube legibly and indelibly immediately before or after addition of sample with number or symbol corresponding to sample, or by chart	0			0			0			0			0			0			0			0		
12. Dye solution—with a burette or 1 ml. pipette, add 1 ml. to each tube either shortly before or after sample	1			0			1			0			0			0			0			0		
13. Sample—measure 10 ml. with sterile (or subjected to practical sterilization) pipette or dipper (or use tubes graduated to contain 10 ml.)	9	2		1	1		4	1		3			0			0			1			0		
(If practical sterilization, chlorine sterilizer not used)	15	23	14		9		10	5	7	2	8			1		3		4			3	0		
Place sample in sterilized or boiled test tubes	5	1		1			1	1		2			0			1			0			0		
Close or stopper immediately with sterilized or boiled rubber stoppers	27	2		5			11	1		6				1		3			2			0		
And avoid recontamination of part of stopper inserted into tube	1	13	7		5		1	4	4		1	1	0				2	1		1	1	0		

14. Incubation—place tubes in water bath at 37° C.,±0.5° C.	15	4	----	1	----	----	10	4	----	0	----	----	0	----	----	2	----	----	2	----	----	0	----	----
After 5 minutes invert tubes a few times	38	17	----	----	8	----	22	----	----	5	8	----	1	----	----	7	----	----	3	----	----	----	1	----
Avoid further agitation which might disturb cream layer	13	1	----	1	----	----	3	----	----	6	----	----	0	----	----	1	----	----	2	----	----	----	1	----
If water bath is not of sufficient capacity to warm samples to 37° C. within 5 minutes or if air incubator is used, warm samples to 37° C. in a water bath not over 40° C.	17	1	3	0	----	----	11	----	3	4	----	----	0	----	----	----	1	----	2	----	----	0	----	----
Determine temperature by immersing bulb of thermometer in blank milk tube	35	3	17	----	----	9	21	1	1	4	2	5	----	----	1	7	----	----	2	----	1	1	----	----
Completely protect samples from light rays (including heat source and pilot light)	16	8	----	----	3	----	8	2	----	2	----	----	1	----	----	8	2	----	1	1	----	1	----	----
15. Observation—observe without lowering temperature of milk	1	----	----	0	----	----	0	----	----	0	----	----	0	----	----	1	----	----	0	----	----	0	----	----
Examine samples for reduction at end of each hour but not beyond 8 hours*	5	8	8	----	4	----	2	1	6	2	2	2	----	1	----	1	----	----	0	----	----	0	----	----
16. Reduction time—express results as number of elapsed full hours when decolorization is first observed*	3	4	5	----	2	----	----	1	2	2	1	2	0	----	----	1	----	----	----	----	1	0	----	----
Samples not reduced at the end of 8 hours are to be reported as reduced in 9 hours*	10	12	16	----	6	----	6	4	10	1	1	3	----	1	----	3	----	----	----	----	3	0	----	----

*Indicates modification required by P.H.S. Milk Code. De=Deviations. Un=Undetermined. No=Not used.

in item 9. Some failure to sterilize equipment was observed, as reported in item 10.

In technique, deviations in manipulation of the sample included not using sterile pipettes or dippers in some instances, and in about half of the laboratories, failure to stopper the test tubes. The requirement of not using chlorine sterilizer appeared in the eighth edition, resulting in the larger numbers recorded in the *undetermined* and *not used* columns shown in item 13. Deviations in incubation were frequent (item 14), over one-fourth of the laboratories not incubating within the required temperature range. There was general deviation as to time and extent of agitation of samples, and general failure to warm samples as prescribed when air incubators were used. The item pertaining to checking the temperature of the water bath appeared in the eighth edition, hence the larger numbers in the *not used* column.

The requirements under items 15 and 16 pertain only to communities operating under the Milk Ordinance and Code recommended by the United States Public Health Service; consequently, this information for laboratories in other communities was noted as *not used.*

DISCUSSION

Observations made during the survey indicate that improvement is necessary if laboratory results are to have the significance attributed to them, not only in milk but also in water analysis and in the diagnostic tests themselves. In general, those tests used primarily for sanitation are a minor interest of many public health laboratories and do not receive the consideration due them. This is particularly unfortunate since laboratory tests are an essential part of a sanitation program, and sanitation is the very basis of public health. However, observations indicate that even the diagnostic tests, probably a major interest in most public health laboratories, are too often done routinely, even poorly.

With special reference to milk analysis, the blame for the present situation seems to be rather equally divided into four aspects. First, the person doing the analysis usually has not been taught standard methods, primarily the responsibility of the teacher who, for various reasons, apparently largely because he neither knows nor understands the reasons for the requirements, pays little attention to this. Secondly, the individual worker himself is commonly to be blamed for not looking into Standard Methods. All too often he has turned to his laboratory manual or textbook used when he studied such laboratory work, not to Standard Methods, possibly again because he was not familiarized with or referred to this material originally. Thirdly, Standard Methods itself is partly to blame, for if it is turned to by

the worker seeking guidance, he is frequently confused by the discussion of pros and cons, alternatives, discussion of an item in one section and then the appearance some pages later of something else pertinent to the same item, so that the worker seeking information may well become confused even if he attempted to follow Standard Methods. Lastly, a considerable share of the responsibility falls upon public health administrators who commonly take laboratory results for granted, notwithstanding the fact that they must realize that such personnel are ordinarily poorly paid and sometimes poorly trained. If some interested administrative official had visited local laboratories and had given them some aid and encouragement in facilities, equipment, procedures, and in-service or additional training, the commonly low caliber of bacteriological milk analysis would have been materially higher. This is borne out by the fact that the only two States really having some system of inspecting the laboratories and the personnel doing milk analysis ranked highest among the 48 States in compliance with Standard Methods pertaining to agar plate counts.

Some such responsibility would logically seem to be a function of an effective public health laboratory. An excellent presentation of "The Need for Official Supervision of Laboratories," with many worth while suggestions, has been published by Mickle (*2*); those interested are referred to this paper.

COMPARATIVE VALUE OF METHODS

Direct microscopic (*Breed's method*).—To return to a brief discussion of the relative merits of the agar plate count compared to the results obtained by direct microscopic examination or by methylene blue reduction, "count" is defined by Webster's Dictionary as "an accurate enumeration of that which is contained by a representative sample; as, a bacterial count." As suggested in the discussion of the second application of the direct microscopic test in Standard Methods, namely, "the making of actual numerical estimates," it might be pointed out that Webster defines "estimate" as "a judgment made by calculation, especially from incomplete data; rough or approximate." Estimates by the direct microscopic method are thus, by definition, only approximations. To equal in accuracy that of a plate count from lower count milk, with from 3,000 to 30,000 colonies per ml., where a 1:100 dilution should show 30 to 300 colonies on the plate, the resulting growth from the entire 0.01 ml. of milk being observed on the plate in counting, theoretically the entire 0.01 ml. of milk on the entire film on the slide used for the direct microscopic method should similarly be observed, amounting to 5,000 to 6,000 fields. Whereas in Standard Methods the number of fields to be examined for such milk is stipulated to be 60 or 120, depending upon

the field diameter used, in practice our observation was that rarely 30 and usually 10 fields were used. Again, compared to the agar plate count above, 10 such microscopic fields would roughly be comparable to estimating a bacterial plate count from only one of the nine smallest divisions of only one of the average 65 sq. cm. areas on the agar plate, whereas actually it is required that the entire 65 sq. cm. be counted for such a plate.

This is mentioned to emphasize the fact that the small amount of milk observed in microscopic methods necessitates high multiplication factors, with consequent larger potential errors. In a comprehensive study of such methods some years ago, Robertson, Moody, and Frayer (*3*) compared agar plate, reductase test, and both individual and clump microscopic counts, and concluded, "The microscopic methods as herein described and used are not as accurate as the agar plate count in milk containing relatively few bacteria because of the failure to examine more microscopic fields on each preparation." Also "However, the counting of a sufficient number of fields to make the microscopic method as accurate as the plate method on a large number of samples of milk is impractical, particularly when one is dealing with milk containing few bacteria."

There are numerous other poorly controlled factors that might be mentioned relative to microscopic methods. As already pointed out, in the surveys considerable errors in technique were noted, even when suitable equipment was available. In addition to errors from not using proper pipettes for measurement and not having the microscope accurately standardized, errors were frequently made in measurement of the 0.01 portion, and in preparation of the film lack of care was not infrequently observed in spreading the portion approximately over the required area. According to a recent report (*4*) both the nature of the stain and the nature of the illumination are unsuitable, permitting numerous bacteria present to be overlooked. Furthermore, workers commonly estimate the number per field and do not enumerate; if they did, fatigue would play an even larger role than at present. Human errors in multiplication and calculation are also a potential hazard. One laboratory in a small city had used the test for a number of years and, instead of observing the bacterial cells, had been enumerating holes in the preparation itself, no immersion oil being used and the appearance of bacteria themselves not being known. In another city where an especially thorough effort was made, each milk sample was analyzed in triplicate, with the usual 10 fields examined on each of the three smears; the results were averaged and the factor was found to be just 25 percent of the correct value. As additional evidence of the great irregularity of the direct microscopic method when applied, had any one of the three preparations alone been used, as is the ordinary practice, the count reported on a sample demonstrated to us

would have been, respectively, 120,000, 30,000, or 60,000 per ml., depending upon which one of the triplicate smears was utilized, inasmuch as actually 4, 1, or 2 bacterial clumps were reported in the 10 representative fields examined.

When it is realized that bacteria present may not be seen or recognized, because backgrounds are frequently confusing, and if attempts are made to count individual cells, there may be many others that are obscured, it might be concluded that the direct microscopic examination is not as simple as some of its proponents imply. Actually, all too often this procedure is turned over to someone in the laboratory without experience in milk sanitation, with the expectation that he or she will observe and report to the milk sanitarian or inspector the type, nature, or probable source of bacteria present. This is sometimes carried out by individuals with so little experience that the organisms are reported by name!

Reports of other investigators indicate that hazards exist in interpretation, too. In discussing the direct microscopic examination of raw milk as indicative of source of contamination, Bryan et al. (*5*) stated, "The suspected trouble was indicated only in those cases where the bacterial count exceeded 100,000 per cubic centimeter of milk," the counts reported being clump counts in which groups or individuals were counted as one. In discussing comparisons with other tests it was stated, "The microscopic count of low count milk is inaccurate, and indicates only that the milk has a very low bacteria count. The accuracy increases as the count of the milk increases." The bacteria counts were divided into four classes, and in class 1, with a (clump) count of less than 100,000 bacteria per cc., it was stated, "In this count range, no suspected trouble is indicated except cells and mastitis streptococci as noted; the scarcity of bacteria does not permit indicating any suspected source of excess contamination."

Another report (*6*) is of interest in that it suggests that the laboratory worker could foresee "how clumps will break up during the plating process." In a report of a comparative study of plate and microscopic counts, counting 20 fields on each sample, it was stated, "Clumps of the same type of bacteria were counted as one. If the clumps showed signs of breaking up, the groups were counted individually." Also, "The close correlation between the average microscopic and plate counts on Grade A milk (microscopic range 0–100,000 per ml.) may be due to the fact that low count milk contains very few clumps of bacteria. It was observed in this study that the bacteria occurred for the most part singly and in pairs." Where differences occurred they suggested no explanation except "possibly, the inability of the technician to judge more accurately how clumps of bacteria will break up during the plating process."

Whereas in the preceding report the bacteria in clumps occurred singly and in pairs, another recent article on the microscopic examination of pasteurized milk (*7*) reported ratios between plate and microscopic counts ranging from 1:260 to 1:25 for street samples, 1:163 to 1:38 for plant samples, and 1:265 to 1:15 for laboratory samples. Mallmann, Bryan, and Fox (*8*) made agar plate counts and microscopic counts before and after pasteurization. They reported that in some instances there was agreement and in others not, both living and dead bacteria being stained, contrary to the reports of others that microscopic counts from pasteurized milk represented mostly viable bacteria, and concluded, "These data would indicate that the microscopic count of pasteurized milk is not always a measure of the viable bacteria present in the sample." Other data presented showed that many dead bacteria did stain and they concluded, "The microscopic count of pasteurized milk, taken directly after pasteurization, represents both living and dead bacteria."

Robertson and Frayer (*9*) in a fifth bulletin summarized their previous studies on variability and discussed at some length applications to raw milk, milk for which premiums are paid for low bacterial counts, and pasteurized milk. With regard to pasteurized milk samples, they stated, "These should always be plated to show the number of viable organisms at 37° C. In addition to this the microscopic method is exceedingly useful in revealing: (1) something of the past history of the milk before pasteurization, (2) the presence of bacterial growth subsequent to pasteurization, and (3) the presence of thermophilic or thermoduric bacteria which enter or grow during the pasteurizing process but which may or may not grow on the plates."

The direct microscopic test has been advocated recently as the sole bacteriological method for pasteurized milk, with any pasteurized milk designated as Grade A if it has not over 200,000 clumps per ml. In addition to the inherent inaccuracies of the procedure itself, it should be pointed out that an excessively high count milk mixed with a larger mass of lower count milk might still result in an average for the whole of under 200,000 clumps per ml., assuming all cells still stained after pasteurization. Since only a varying percentage do so stain, the original count of the milk might have still further exceeded any standard in any individual instance, yet be thinned out in the larger volume so that the entire supply would appear to be of acceptable quality. This would seem to obviate the use of this test as indicative of the original condition of the milk prior to pasteurization, just as the variable proportion staining would render it an inexact estimate of viable organisms after pasteurization.

Similarly, the practice of adding formalin to pasteurized milk samples prior to shipment to a laboratory, with the idea that after microscopic examination a constant factor can be applied to estimate

the number viable before the formalin was added, cannot be substantiated.

Methylene blue reduction.—It would seem unnecessary to discuss at any length the relative accuracy of the agar plate count and the methylene blue test. The methylene blue reduction test is commonly used in England, and a statistical study there (*10*) concluded that the plate count was slightly more sensitive than the methylene blue reduction test observed every half hour. Bearing in mind the deviations reported upon agar plate counts in a preceding paper, it would appear that surely deviations in the agar plate count would have been present even in such a comparative study, and if such plate counts were better done an even more favorable result would be expected. Where no other laboratory facilities are available, and possibly in metropolitan areas with excessively large numbers of producers, the reduction test has some value. Unfortunately it furnishes less information than is frequently desirable, especially where with increased sanitation most of the samples may not be reduced within the time observed. Under these conditions if some of the samples were analyzed by a more accurate method they might be found to reflect approaching breakdowns in sanitation, which the rougher method might not reveal, thus permitting correction before the situation was out of bounds. A rougher test such as methylene blue reduction might continue to pass such milk as satisfactory for some time beyond that indicated by more accurate tests.

Robertson, Moody, and Frayer (*3*) compared agar plate, reductase test, and both individual and clump microscopic counts, and concluded, " * * * the reductase test is more variable than either the agar plate or microscopic methods. This is particularly true when milk containing few bacteria is under observation."

Other deviations are indicated in the discussion of potential material to be studied by the subcommittee on methylene blue test procedure (*11*), including variations in the quantity of the sample, icing of some samples for considerable periods before analysis, failure to stopper tubes, sterilize stoppers, or avoid their contamination in handling, variation in the number, time, and nature of agitations of samples, and variations in temperature of incubation.

Robertson and Frayer (*9*) concluded: "(1) That the agar plate method (logarithmic relations between the counts) is the most feasible method for use (*a*) where premiums are paid for low-count milk and (*b*) where control agencies are examining milk samples; and (2) That the microscopic method and reduction test should be reserved for rapid field work where the object is chiefly to determine whether the milk is good, medium or poor." They also stated, "When workers fully realize

and accept the limitations of any one technique and reserve the use of that technique for the purpose or type of milk sample to which it is best adapted, there will be fewer arguments about accuracy and variability."

The necessity of laboratory control in milk production and handling is generally agreed to, and while the results may not permit immediate segregation of milk, laboratory results are particularly helpful in showing deficiencies in practice frequently overlooked in inspection, or may confirm observations of inspection with tangible results. No doubt improved tests could be developed: however it is evident that many places are not using the present tests to the best advantage, particularly when they have departed from the Standard Methods procedures. The present surveys have shown that most laboratories have failed to conform to such procedures; however, it should be pointed out that the unsatisfactory conditions referred to at the time of the original surveys have been corrected in many instances, and continued improvement should be expected if proper emphasis is placed upon correct performance of such analyses.

(NOTE.—Part III, on sampling and health department practice, will appear in an early issue.)

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PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 30, 1943

Summary

The incidence of poliomyelitis continues to decline, but it has not yet reached the median expectancy based on the 5 years 1938–42. A total of 363 cases was reported for the current week, as compared with 438 for the preceding week and a 5-year median of 247. Decreases were recorded in all geographic areas except the East South Central, which area reported 9 cases as compared with 3 for the preceding week. Only 6 States reported more than 20 cases and only 10 States reported more than 10 cases for the week. The following-named States reported more than 30 cases (last week's figures in parentheses): Illinois 38 (57), California 58 (84), and Washington 37 (24). A total of 11,120 cases has been reported to date.

The incidence of meningococcus meningitis also declined, but remained at a level more than five times the 5-year median expectancy. A total of 198 cases was reported currently, as compared with 224 last week, 68 for the corresponding week in 1942, and a 5-year median of 35. A total of 15,380 cases has been reported to date this year, as compared with 2,911 for the same period last year and a 5-year median of 1,705 cases.

Only 3 cases of smallpox and 88 cases of typhoid fever were reported during the current week, as compared with 5-year medians of 25 and 239, respectively. The incidence of both diseases to date is below that for last year, in which year the lowest incidence of record was established for these diseases.

A total of 3,588 cases of endemic typhus fever has been reported to date this year, as compared with 3,013 for the same period last year. For the current week, 109 cases were reported, of which 35 occurred in Georgia, 25 in Alabama, and 21 in Texas.

Deaths recorded for the week in 87 large cities in the United States totaled 8,636, as compared with 8,393 in the same cities last week, and a 3-year average of 8,041 for the week. The cumulative figure to date is 380,683, as compared with 353,104 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended October 30, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Oct. 30, 1943	Oct. 31, 1942		Oct. 30, 1943	Oct. 31, 1942		Oct. 30, 1943	Oct. 31, 1942		Oct. 30, 1943	Oct. 31, 1942	
NEW ENGLAND												
Maine	0	0	1	------	------	------	46	1	5	3	2	0
New Hampshire	0	0	0	------	4	------	1	8	1	0	1	0
Vermont	0	0	0	------	------	------	66	63	6	0	0	0
Massachusetts	5	1	5	------	------	------	176	171	101	12	4	1
Rhode Island	0	2	1	------	------	------	26	15	9	3	1	0
Connecticut	0	0	0	5	7	1	6	34	21	8	1	0
MIDDLE ATLANTIC												
New York	6	20	18	[1] 5	[1] 9	[1] 8	166	83	89	26	17	1
New Jersey	2	6	8	4	6	3	132	22	22	6	4	0
Pennsylvania	13	21	21	1	------	------	68	112	112	15	7	4
EAST NORTH CENTRAL												
Ohio	15	25	25	2	6	6	262	23	23	4	2	1
Indiana	12	4	17	12	14	10	56	16	14	2	1	1
Illinois	12	17	17	9	5	8	23	16	16	10	2	2
Michigan [2]	10	6	6	------	1	------	255	39	44	7	0	2
Wisconsin	6	0	1	6	22	22	390	43	53	5	0	0
WEST NORTH CENTRAL												
Minnesota	8	3	2	------	------	2	292	12	12	2	1	1
Iowa	2	1	9	------	3	2	7	14	14	3	0	0
Missouri	4	6	13	6	2	2	5	1	7	6	0	0
North Dakota	2	0	0	------	------	1	99	1	7	0	0	0
South Dakota	4	1	2	------	------	------	5	1	2	1	0	0
Nebraska	6	2	2	3	5	------	6	29	4	1	0	0
Kansas	4	5	4	------	------	1	8	16	16	3	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	14	1	1	2	0	0
Maryland [2]	4	4	5	2	1	4	5	8	8	7	1	1
District of Columbia	1	0	1	------	1	1	5	0	1	7	1	0
Virginia	15	46	49	128	182	60	85	12	12	[3] 12	4	1
West Virginia	2	14	15	------	7	7	60	2	2	0	0	0
North Carolina	43	59	125	5	2	2	45	1	51	2	2	2
South Carolina	8	30	31	249	201	201	21	4	2	1	0	1
Georgia	19	33	53	17	2	30	13	1	2	3	1	0
Florida	21	33	8	1	8	2	14	2	2	2	1	1
EAST SOUTH CENTRAL												
Kentucky	9	22	22	2	1	1	6	2	11	4	0	2
Tennessee	14	15	24	1	37	19	38	5	5	6	3	3
Alabama	37	41	44	30	68	33	16	1	3	2	2	1
Mississippi [2]	8	17	17	------	------	------	------	------	------	2	1	1
WEST SOUTH CENTRAL												
Arkansas	3	20	20	15	23	27	2	9	8	1	1	0
Louisiana	2	5	20	1	2	4	1	0	1	3	0	0
Oklahoma	2	23	23	20	62	51	4	2	6	0	0	0
Texas	45	54	54	737	503	217	17	12	17	2	0	0
MOUNTAIN												
Montana	1	4	2	------	------	4	70	9	9	0	0	0
Idaho	0	0	0	------	2	------	0	26	9	0	0	0
Wyoming	2	0	1	2	26	2	7	3	3	0	1	0
Colorado	12	10	9	15	34	14	11	6	16	4	0	0
New Mexico	6	1	1	1	2	1	1	7	7	1	0	0
Arizona	8	6	5	79	44	65	5	14	14	1	0	0
Utah [2]	0	0	0	------	1	2	3	112	7	2	0	0
Nevada	0	0	0	------	------	------	1	1	0	1	0	0
PACIFIC												
Washington	9	0	1	31	------	------	25	264	11	7	1	1
Oregon	2	6	4	9	13	13	23	83	17	1	1	1
California	30	33	23	19	33	28	57	24	73	8	5	2
Total	409	596	668	1,417	1,339	1,093	2,639	1,331	1,359	[3] 198	68	35
43 weeks	10,712	11,789	12,218	91,225	89,696	156,891	551,026	474,381	474,381	15,380	2,911	1,705

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 30, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Oct. 30, 1943	Oct. 31, 1942		Oct. 30, 1943	Oct. 31, 1942		Oct. 30, 1943	Oct. 31, 1942		Oct. 30, 1943	Oct. 31, 1942	
NEW ENGLAND												
Maine	0	2	0	17	11	9	0	0	0	0	2	1
New Hampshire	0	3	0	8	9	3	0	0	0	0	0	0
Vermont	1	3	1	10	1	5	0	0	0	2	0	0
Massachusetts	7	1	2	121	189	73	0	0	0	4	2	2
Rhode Island	5	0	0	1	6	3	0	0	0	0	1	1
Connecticut	7	0	0	31	19	21	0	0	0	1	0	1
MIDDLE ATLANTIC												
New York	26	6	12	168	200	163	0	0	0	7	8	14
New Jersey	4	11	5	48	60	59	0	0	0	1	1	2
Pennsylvania	6	3	5	139	115	115	0	0	0	3	6	10
EAST NORTH CENTRAL												
Ohio	3	4	8	257	184	171	0	0	0	4	14	6
Indiana	4	4	5	67	51	51	1	0	1	1	0	1
Illinois	38	8	8	108	160	178	0	1	1	2	13	15
Michigan [2]	17	4	8	117	53	122	0	0	0	1	4	4
Wisconsin	13	1	3	126	122	104	0	0	0	1	1	1
WEST NORTH CENTRAL												
Minnesota	7	3	13	61	53	56	0	0	0	0	0	1
Iowa	4	3	3	57	54	58	0	0	1	5	0	2
Missouri	0	1	1	33	59	59	0	0	0	2	1	5
North Dakota	1	0	1	9	12	10	0	0	0	0	0	1
South Dakota	0	2	2	12	20	20	0	2	0	1	0	1
Nebraska	3	6	1	43	13	15	0	1	1	0	0	0
Kansas	21	11	1	55	60	60	0	0	0	0	3	1
SOUTH ATLANTIC												
Delaware	0	0	0	1	11	7	0	0	0	1	1	2
Maryland [3]	1	0	2	35	32	21	0	0	0	0	3	6
District of Columbia	2	0	0	18	22	13	0	0	0	0	1	1
Virginia	1	1	4	34	77	52	0	0	0	6	9	10
West Virginia	0	0	1	63	48	51	0	0	0	1	0	4
North Carolina	1	2	1	113	128	128	1	0	0	2	3	3
South Carolina	0	2	1	13	10	17	0	0	0	0	4	8
Georgia	0	1	1	49	50	38	0	0	0	4	5	9
Florida	0	2	1	11	7	4	0	0	0	0	3	1
EAST SOUTH CENTRAL												
Kentucky	6	1	5	50	62	73	0	0	0	4	3	12
Tennessee	0	1	1	38	81	80	0	0	0	4	9	6
Alabama	3	4	4	38	36	39	0	0	0	5	8	11
Mississippi [2]	0	2	3	11	14	15	1	0	0	5	8	4
WEST SOUTH CENTRAL												
Arkansas	0	2	2	7	5	7	0	0	0	0	6	6
Louisiana	0	1	1	8	5	10	0	0	0	0	3	7
Oklahoma	8	0	0	8	20	20	0	0	2	1	0	5
Texas	19	12	3	41	57	48	0	1	1	8	12	14
MOUNTAIN												
Montana	0	0	0	31	8	18	0	0	0	0	0	0
Idaho	2	0	1	13	4	12	0	0	1	0	0	1
Wyoming	1	0	0	1	1	5	0	0	0	0	0	0
Colorado	8	1	2	21	9	23	0	1	1	0	5	5
New Mexico	2	1	0	6	3	6	0	0	0	3	1	2
Arizona	3	1	1	15	0	1	0	0	0	1	4	1
Utah [2]	15	8	3	13	12	10	0	0	0	0	0	0
Nevada	2	0	0	1	0	0	0	0	0	0	0	0
PACIFIC												
Washington	37	3	3	61	19	27	0	2	1	2	1	3
Oregon	27	3	2	19	9	13	0	0	1	2	0	1
California	58	21	7	148	103	103	0	1	1	4	0	7
Total	363	140	247	2,355	2,284	2,284	3	9	25	88	135	239
43 weeks	11,120	3,519	6,245	118,474	102,851	131,066	648	683	2,089	4,827	6,001	8,399

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 30, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended— Oct. 30, 1943	Whooping cough: Week ended— Oct. 31, 1942	Whooping cough: Median 1938–42	Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	8	46	29	0	0	0	0	0	0	0	0	0
New Hampshire	1	2	4	0	0	0	0	0	0	0	0	0
Vermont	27	49	24	0	0	0	0	0	0	0	0	0
Massachusetts	57	190	104	1	0	13	0	0	0	0	0	0
Rhode Island	13	4	30	0	0	0	0	0	0	0	0	0
Connecticut	52	78	58	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	250	444	405	1	1	35	0	1	0	1	0	0
New Jersey	69	169	117	0	1	0	0	0	0	0	0	0
Pennsylvania	154	235	276	1	1	2	0	1	0	0	0	0
EAST NORTH CENTRAL												
Ohio	86	189	169	0	0	0	0	0	0	0	0	0
Indiana	16	19	19	0	0	0	0	0	0	0	0	0
Illinois	137	171	192	0	3	1	0	0	0	0	0	0
Michigan [2]	128	154	215	0	0	2	0	0	0	0	0	0
Wisconsin	175	130	168	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	55	13	52	0	2	0	0	0	0	0	0	0
Iowa	22	16	16	0	3	0	0	0	0	0	1	0
Missouri	16	8	22	0	0	0	2	0	0	0	0	0
North Dakota	8	6	18	0	0	0	0	0	0	0	0	0
South Dakota	5	0	0	0	0	0	0	0	0	0	0	0
Nebraska	21	10	5	0	0	0	0	0	0	0	0	0
Kansas	39	30	30	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	4	4	0	0	0	0	0	0	0	0	0
Maryland [2]	31	87	56	0	0	0	1	0	0	0	0	0
District of Columbia	10	14	12	0	0	0	0	0	0	0	0	1
Virginia	58	11	35	0	0	0	53	0	0	2	1	1
West Virginia	2	22	22	0	0	0	0	0	0	0	0	0
North Carolina	130	42	61	0	0	0	0	0	0	0	0	6
South Carolina	32	6	21	0	0	2	0	0	0	0	0	4
Georgia	9	11	11	0	0	3	0	0	0	0	0	35
Florida	19	3	6	0	2	3	0	0	0	0	0	5
EAST SOUTH CENTRAL												
Kentucky	64	32	58	0	0	2	0	0	0	1	0	0
Tennessee	27	21	36	0	1	0	4	0	0	0	0	1
Alabama	6	31	28	0	0	0	0	0	0	0	0	25
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	1	2
WEST SOUTH CENTRAL												
Arkansas	25	34	14	0	0	14	0	0	0	0	0	1
Louisiana	1	4	5	0	0	0	0	0	0	0	1	4
Oklahoma	1	6	6	0	0	0	0	0	0	0	0	0
Texas	68	69	69	0	15	153	0	0	1	0	3	21
MOUNTAIN												
Montana	23	13	17	0	0	0	0	0	0	0	0	0
Idaho	0	3	2	0	0	0	0	0	0	0	0	0
Wyoming	10	1	6	0	0	0	0	0	0	0	0	0
Colorado	52	7	20	0	0	0	0	0	0	0	0	0
New Mexico	3	6	13	0	0	5	3	0	0	0	0	0
Arizona	15	8	3	0	1	0	15	0	0	0	0	0
Utah [2]	16	9	15	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	87	13	43	0	0	0	0	0	0	0	0	0
Oregon	54	2	10	0	0	0	0	0	0	0	0	0
California	85	187	155	0	3	12	0	4	0	1	0	0
Total	2,177	2,537	3,125	3	33	277	83	6	1	5	8	109
43 weeks	156,828	149,727	150,098	56	1,779	13,082	3,664	592	24	427	682	3,558
43 weeks, 1942	------	------	------	70	1,009	10,799	5,941	482	40	445	746	3,014

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Exclusive of delayed report (included only in cumulative total) of 4 cases in Virginia.
[4] Including paratyphoid fever cases reported separately as follows: Massachusetts, 4; New York, 1; New Jersey, 1; Michigan, 1; Georgia, 1; Tennessee, 1; Washington, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 16, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	1	0	------	0	3	0	1	0	2	0	1	2
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	------	1	3	7	13	5	43	0	1	40
Fall River	0	0	------	0	0	0	0	3	2	0	0	0
Springfield	0	0	------	0	1	0	2	0	8	0	0	5
Worcester	0	0	------	0	1	0	2	0	12	0	0	0
Rhode Island:												
Providence	0	0	------	0	18	1	3	5	3	0	0	41
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	1	6	0	0	0
Hartford	1	0	------	0	1	0	3	1	4	0	0	1
New Haven	0	0	------	0	0	1	3	1	1	0	0	2
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	4	1	5	7	2	0	0	10
New York	7	3	5	4	61	17	45	16	85	0	4	79
Rochester	0	0	------	0	2	0	2	0	6	0	0	6
Syracuse	0	0	------	0	0	0	2	0	1	0	0	19
New Jersey:												
Camden	0	0	------	0	2	1	0	0	0	0	0	0
Newark	0	0	------	1	1	1	4	1	7	0	0	18
Trenton	0	0	------	0	0	0	2	0	1	0	0	3
Pennsylvania:												
Philadelphia	3	0	1	0	10	7	18	1	24	0	1	62
Pittsburgh	2	0	------	1	15	6	24	1	30	0	1	11
Reading	0	0	------	0	0	0	0	0	1	0	0	3
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	20	3	0	1	26	0	0	11
Cleveland	0	0	------	0	0	9	14	4	33	0	1	23
Columbus	1	0	------	0	8	0	1	2	13	0	0	4
Indiana:												
Fort Wayne	0	0	------	0	0	1	1	0	4	0	0	0
Indianapolis	0	0	------	0	1	0	4	0	12	0	0	5
South Bend	0	0	------	0	2	0	0	0	1	0	0	0
Terre Haute	1	0	------	0	1	0	1	0	1	0	0	0
Illinois:												
Chicago	2	0	------	1	2	10	19	30	25	0	0	74
Springfield	0	0	------	0	0	0	1	0	0	0	0	2
Michigan:												
Detroit	11	0	------	0	9	5	9	5	36	0	2	36
Flint	0	0	------	0	0	0	0	0	3	0	0	15
Grand Rapids	0	0	------	0	1	0	0	2	3	0	0	1
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	5	0	0	0
Milwaukee	0	0	------	0	2	1	0	1	28	0	0	44
Superior	0	0	------	0	72	0	0	0	0	0	0	6
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	5	0	3	0	2	0	0	15
Minneapolis	6	0	------	1	18	0	2	2	25	0	0	4
St. Paul	0	0	------	0	17	0	1	2	6	0	0	16
Missouri:												
Kansas City	3	0	------	0	1	3	7	1	8	0	0	7
St. Joseph	0	0	------	0	0	0	0	0	3	0	0	0
St. Louis	2	0	2	0	0	1	11	0	10	0	0	5
Nebraska:												
Omaha	2	0	------	0	0	0	3	1	9	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	0	1	0	0	0	2
Wichita	0	0	------	0	1	0	1	1	5	0	0	2

City reports for week ended Oct. 16, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0		0	1	1	0	0	0	0	0	0
Maryland:												
Baltimore	2	0	1	1	4	4	6	1	8	0	0	30
Cumberland	0	0	---	0	0	0	0	0	0	0	0	0
Frederick	0	0	---	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	--	0	1	1	3	0	17	0	0	9
Virginia:												
Lynchburg	0	0	-	0	21	0	2	0	1	0	0	12
Richmond	0	0	--	0	0	0	1	1	2	0	0	1
Roanoke	0	0	----	0	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0		0	2	0	0	0	3	0	0	0
Wheeling	0	0	-	0	0	2	3	0	1	0	1	1
North Carolina:												
Winston-Salem	1	0	-	0	0	1	2	0	4	0	0	6
South Carolina:												
Charleston	0	0	5	1	0	0	1	0	3	0	1	0
Georgia:												
Atlanta	2	0	8	0	1	1	1	0	5	0	0	2
Brunswick	1	0	------	0	2	0	1	0	1	0	0	0
Savannah	0	0	------	0	1	0	2	0	2	0	0	3
Florida:												
Tampa	0	0	------	0	0	0	0	0	0	0	0	1
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	-----	0	0	0	0	0	0	0	0	2
Nashville	0	0	-----	0	0	0	0	0	3	0	0	4
Alabama:												
Birmingham	0	0	---	0	0	0	3	0	1	0	0	0
Mobile	0	0	1	0	0	0	2	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	---	0	0	0	0	0	1	0	0	0
Louisiana:												
New Orleans	0	0	1	1	1	0	6	0	2	0	4	1
Shreveport	1	0	---	0	0	0	0	0	0	0	0	0
Texas:												
Dallas	0	0	---	0	0	0	0	1	3	0	0	2
Galveston	0	0	-	0	0	0	0	0	0	0	0	3
Houston	1	0		0	1	1	8	0	2	0	2	3
San Antonio	1	0	2	2	1	0	5	1	1	0	0	0
MOUNTAIN												
Montana:												
Billings	3	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	----	0	15	0	0	0	1	0	0	3
Helena	0	0	-----	0	0	0	0	0	0	0	0	0
Missoula	0	0	-----	0	0	0	2	0	1	0	0	0
Idaho:												
Boise	0	0	--	0	0	0	1	0	0	0	0	6
Colorado:												
Denver	2	0	3	0	1	0	7	2	1	0	0	17
Pueblo	0	0	------	0	1	0	2	1	3	0	0	2
Utah:												
Salt Lake City	0	0	------	0	1	0	0	2	3	0	0	11
PACIFIC												
Washington:												
Seattle	0	0	------	0	2	0	1	5	0	0	0	11
Spokane	0	0	------	0	3	0	1	0	6	0	0	4
Tacoma	0	0	------	0	0	0	2	1	2	0	0	2
California:												
Los Angeles	4	0	3	0	2	3	3	7	12	0	0	12
Sacramento	0	0	--	0	1	0	2	4	4	0	1	1
San Francisco	0	0	4	0	0	3	10	10	18	0	0	11
Total	63	3	36	15	344	92	285	131	606	0	20	736
Corresponding week, 1942	101	0	83	19	199	31	313	45	515	0	22	939
Average, 1938–42	104	------	62	[1] 14	[2] 254	-----	[1] 276		477	1	36	1,030

Anthrax.—Cases: Philadelphia, 1. *Dysentery, amebic.*—Cases: Boston, 1; New York, 2.

Dysentery, bacillary.—Cases: New York, 6; Rochester, 1; Chicago, 4; Detroit, 4; St. Louis, 1; Baltimore, 1; Charleston, S. C., 3; Los Angeles, 9.

Dysentery, unspecified.—Cases: Baltimore, 1; Richmond, 4; Memphis, 1.

Rocky Mountain spotted fever.—Cases: Terre Haute, 1.

Typhus fever.—Cases: Boston, 1; New York, 2; Richmond, 1; Winston-Salem, 3; Charleston, S. C., 2; Atlanta, 2; Savannah, 9; Memphis, 1; Nashville, 1; Birmingham, 1; Mobile, 2; New Orleans, 2; Dallas, 1.

[1] 3-year average, 1940–42. [2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,582,700)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	7.5	0.0	0.0	2.5	67.1	22.4	69.6	39.8	201.2	0.0	5.0	226
Middle Atlantic	5.4	1.3	2.7	2.7	42.4	14.7	45.5	11.6	70.0	0.0	2.7	94
East North Central	9.0	0.0	0.0	1.2	69.4	17.1	29.4	26.5	111.8	0.0	1.8	131
West North Central	25.7	0.0	4.0	2.0	83.1	7.9	55.4	15.8	132.5	0.0	0.0	101
South Atlantic	10.4	0.0	24.3	3.5	57.3	17.4	38.2	3.5	81.6	0.0	3.5	118
East South Central	5.9	0.0	5.9	0.0	0.0	0.0	29.7	0.0	23.8	0.0	0.0	36
West South Central	8.8	0.0	8.8	8.8	8.8	2.9	55.7	5.9	26.4	0.0	17.6	26
Mountain	40.2	0.0	24.1	0.0	144.7	0.0	96.5	40.2	72.4	0.0	0.0	314
Pacific	7.0	0.0	12.2	0.0	14.0	10.5	33.2	47.2	73.4	0.0	1.7	72
Total	9.5	0.5	5.4	2.3	51.9	13.9	43.0	19.8	91.4	0.0	3.0	111

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—Up to October 21, 1943, a total of 662 cases of dengue fever was reported in Honolulu, Hawaii Territory.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 2, 1943.—During the week ended October 2, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		1	9	51	70	7	21	10	30	199
Diphtheria	4	29	1	39	1	2			1	77
Dysentery (bacillary)				4						4
German measles		6		1	4	2	1	2	4	20
Influenza		15	1		27	1			6	50
Measles			1	107	34	33	1	14	35	225
Meningitis, meningococcus				6	3					9
Mumps		11		11	28	12	6	9	24	101
Poliomyelitis				12	7			1	1	21
Scarlet fever		12	1	72	61	21	43	21	22	253
Tuberculosis (all forms)		2	2	118	36	27	50	18	66	319
Typhoid and paratyphoid fever				30	3			3		36
Whooping cough		11		82	90	25		34	11	253

CUBA

Habana—Communicable diseases—4 weeks ended October 16, 1943.—During the 4 weeks ended October 16, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	19	2	Measles	12	
Leprosy	1		Tuberculosis	7	3
Malaria	5		Typhoid fever	19	2

Provinces—Notifiable diseases—4 weeks ended October 9, 1943.—During the 4 weeks ended October 9, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2		3	4		8	17
Diphtheria	2	25	3	2			32
Hookworm disease		12					12
Leprosy		2					2
Malaria	53	21	16	34	14	192	330
Measles		9		1			10
Poliomyelitis			1	1			2
Tuberculosis	15	89	9	24	1	53	191
Typhoid fever	18	35	16	40	10	69	188
Whooping cough				1			1
Yaws						3	3

[1] Includes the city of Habana.

FINLAND

Notifiable diseases—August 1943.—During the month of August 1943, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	18	Paratyphoid fever	313
Chickenpox	224	Pneumonia	460
Conjunctivitis	26	Poliomyelitis	36
Diphtheria	923	Puerperal fever	46
Dysentery	35	Rheumatic fever	232
Gastroenteritis	6,579	Scabies	1,857
Gonorrhea	764	Scarlet fever	410
Hepatitis, epidemic	636	Syphilis	442
Influenza	427	Tetanus	3
Laryngitis	32	Typhoid fever	50
Malaria	1	Vincent's angina	25
Measles	965	Whooping cough	719
Mumps	208		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Iran.—During the week ended August 14, 1943, 57 cases of typhus fever with 9 deaths were reported in Iran.

Yellow Fever

Gold Coast—Asuboi.—On September 12, 1943, 1 case of yellow fever with 1 death was reported at Asuboi, near Nsawam, Gold Coast.

DEATHS DURING WEEK ENDED OCTOBER 23, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 23, 1943	Corresponding week, 1942
Data for 89 large cities of the United States:		
Total deaths	8,552	8,444
Average for 3 prior years	8,152	
Total deaths, first 42 weeks of year	379,677	351,391
Deaths under 1 year of age	562	605
Average for 3 prior years	559	
Deaths under 1 year of age, first 42 weeks of year	27,246	24,120
Data from industrial insurance companies:		
Policies in force	65,963,981	65,170,956
Number of death claims	12,199	12,473
Death claims per 1,000 policies in force, annual rate	9.6	10.0
Death claims per 1,000 policies, first 42 weeks of year, annual rate	9.7	9.1

COURT DECISION ON PUBLIC HEALTH

Public water supply—protection against pollution—reasonableness of State board of health regulations.—(New Hampshire Supreme Court; *Willis* v. *Wilkins et al.*, 32 A.2d 321; decided May 4, 1943.) The town of Pembroke, which obtained its public water supply from a certain great pond, filed with the New Hampshire State Board of Health a petition for water supply regulation under statutory provisions, alleging that the pond was in danger of contamination. The board of health held hearings on this petition and subsequently adopted regulations which prohibited swimming and bathing in the pond and forbade the erection and maintenance of any structure upon the ice of the pond. The owners of lands located on the shore of the pond sought to have these regulations declared void and concluded their petition with a prayer for equitable relief. Facts were found by a master who recommended that the plaintiffs' petition be dismissed. The plaintiffs excepted and the questions of law raised by their exceptions were transferred by the superior court without a ruling to the State supreme court.

The latter court first made several findings which may be summarized as follows:

(*a*) The rights affected by the regulations in question comprised rights which the plaintiffs were privileged to enjoy primarily as members of the public together with certain incidental rights which they possessed as owners of lands bordering the pond, but the plaintiffs were not entitled to compensation even though their lands might be less valuable because of the curtailment of such rights.

(*b*) It was unimportant that formal notice of the investigation by the State board of health was not served upon the plaintiffs as riparian proprietors. (The court pointed out that the statute contained no

provision for notice other than a requirement for the posting or publication of the regulations made, but that in the instant case, however, notice was given both by posting and publication and that some of the plaintiffs appeared at the hearings and participated therein.)

(*c*) The plaintiffs' contention that the board erred in not granting certain requests for findings of fact and rulings of law was without merit, inasmuch as the plaintiffs were not entitled to a hearing as of right and the board could, if it saw fit, adopt a summary procedure.

(*d*) It was immaterial that certain board members participating in the final deliberations did not hear all the testimony introduced at both hearings, as the board could act upon its own inspection and knowledge, was not obliged to hear any party, and could obtain its information from any source and in any way.

(*e*) The plaintiffs had failed, so far as the record was concerned, to show that the board had acted illegally in respect to jurisdiction, authority, or observance of the law.

After setting forth the above rulings the supreme court stated that the regulations, however, could not stand if they were indisputably unreasonable. The plaintiffs, being for the most part owners of cottages which they occupied in summer for recreational purposes, had rights incidental to the enjoyment of public rights in the pond which were more extensive than those of one who was only a member of the public, and, according to the court, although no part of their property was "taken" in the constitutional sense of the term by force of the regulations, the beneficial use of such property was unquestionably impaired thereby, with a resulting depreciation in value. "This fact is, in our opinion, a material circumstance to be considered in determining whether or not the prohibition can be found to be reasonable. But no such determination can be made on the present transfer, since the master in reaching his conclusion has failed to consider all the material evidence bearing on the issue." There was evidence to the effect that the bacteria in the pond were largely eliminated by natural self-purification; that the lowering of the intake of the water system to the depth of 20 feet would be an almost perfect safeguard against summer pollution, and that the cost of such lowering would be from $1,600 to $2,500; that chlorination rendered the water practically sterile, that the cost of installing an automatic chlorination plant would be about $2,500, and that the annual expense of maintaining and operating such a plant would be about $200. The plaintiffs, in support of their claim that the regulations were arbitrary and unreasonable, had offered to prove that the market value of their properties before the restrictions on the use of the pond were imposed was approximately $70,000 but that the board's action had reduced such value from 50 to 75 percent. This evidence was excluded by the

master as immaterial, but the supreme court held that such exclusion constituted reversible error and that the master's report had to be set aside and a new trial ordered. The court's view was that, in passing upon the reasonableness of regulations promulgated under legislative authority, the importance of the public benefit which the regulations sought to promote was to be balanced against the seriousness of the restriction of private right sought to be imposed.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

Vol. 58 • NOVEMBER 12, 1943 • *No. 46*

THE DIET IN GERMANY AND THE OCCUPIED COUNTRIES DURING THE SECOND WORLD WAR

By CHARLES G. SPICKNALL, *Passed Assistant Surgeon,* HOWARD D. FISHBURN, *Passed Assistant Surgeon,* and WILLIAM S. BAUM, *Assistant Surgeon, United States Public Health Service*

The material presented in this paper was obtained during the writers' stay in Germany prior to and after the outbreak of war between the United States and Germany, that is, between August 1941 and May 1942, and from sources in the United States. Information concerning food rations was obtained from the records of the prisoner-of-war and the commercial sections of the American Embassy in Berlin, the German newspapers, German civilians including physicians, a few citizens of occupied countries, prisoners of war including captive physicians, and from the writers' observations on civilians, prisoners of war, and the diplomatic group interned at Bad Nauheim after December 11, 1941, and from material supplied by the Office of War Information. It is believed that the data are reliable except as noted in the paper. For example, ration changes were published in the German newspapers; it was a simple matter to check the food cards issued to the German civilians to see that they corresponded to the amounts stated in the newspapers.

England and France declared war on Germany on Sunday, September 2, 1939. On Monday, food rationing was begun in Germany. Thus it is evident that all preparations had been made for immediate rationing upon the outbreak of hostilities. The central government of the Third Reich determined the amounts of food allowed; food cards were distributed by the local governments. For the ration period, which was of 4 weeks' duration, each person received an allotted number of coupons, these coupons to be given to the shopkeeper or restaurant as purchases were made.

Even before the outbreak of war, consumption of food by German civilians was restricted. Such products as peanuts and bananas had all but disappeared from the markets and there were shortages of meat, fats, and dairy products. After rationing was put into effect, all foods were restricted. The number of eggs obtainable varied,

only two per person being available in Berlin during the month of November 1941. Twelve was the maximum allowed, but the average, over the ration period up to May 1942, was three eggs per person per month. Since October 1942, the allowance has been two eggs per month.

No ration cards for fish were issued but consumers were required to register with the retail dealers. It is estimated that 93 percent of the North Sea supply had been cut off by the war. The average consumption of fish was 120 to 250 gm. weekly. One hundred and fourteen gm. of polished rice were allowed per week. Coupons were issued for 228 gm. of rolled oats per week, 44 gm. of noodles, macaroni, spaghetti, and corn meal per week, and 114 gm. of dried peas, lentils, dried beans, etc., per week. The amount of these foods that could be obtained was variable. Seldom was a sufficient supply available for even half of the allowed amount. Thirty-one gm. of artificial honey a week could be obtained. Since October 1942, normal consumers have been allowed 150 gm. of "Naehrmittel" (corn meal, noodles, etc.); children under 3 years of age, 275 gm., and children 3 to 6 years of age, 212 gm. Thirty-one gm. of artificial honey and 15 gm. of cocoa powder have been given to children weekly since October.

Except as noted above the German civilians did not have much difficulty in purchasing the amounts called for on their ration cards.

During the summer of 1941, potatoes were not rationed, but during the winter of 1940–41, only 2.5 kg. of potatoes were allowed per person a week. Potatoes were served peeled and boiled with nearly every meal in Germany. On November 18, 1941, an order was issued that potatoes must be served *unpeeled* three times a week in the German restaurants. In the latter part of the potato gathering season in 1941 severe cold weather occurred. Many potatoes and other vegetables probably were frozen, since in the winter of 1941–42 the potatoes had a very disagreeable sweetish taste. Since October 1942, 4.5 kg. of potatoes have been allowed for the normal consumer and 6.0 kg. for miners. The per capita consumption of potatoes before the war is estimated at 3.3 to 3.5 kg. per week.[1]

The increase in the potato and bread rations in October 1942 may indicate that the potato and grain crops showed an increase in 1942.

The amounts of other vegetables naturally varied with the season. Cabbage, red and white, and other members of the cabbage family were served very frequently. Sauerkraut was eaten less often than cabbage. Carrots were served often. During the spring and early summer of 1941, 2 kg. of tomatoes per week were allowed, and smaller amounts of lettuce, cauliflower, spinach, and turnips.

The supply of fruit was likewise seasonal. Apples were the principal fruit seen and small amounts of grapes, pears, and oranges. During

[1] Richter, J. H.: Food rationing in Germany. Foreign Agriculture, October 1941.

the summer of 1941, 0.5 kg. of fruit was allowed each adult. The supply of fruit was used principally for the armed forces, the sick, the children, and pregnant women.

The armed forces were undoubtedly well-fed, although no figures were available. Special diets for the sick could be obtained with much difficulty and delay. Pregnant women received extra food.

At the beginning of the war, bread was not rationed; it was claimed that a sufficient supply of grain was available. However, it was found after several months that the consumption of bread had so increased that rationing became necessary.

The two principal types of bread consumed in Germany were the so-called white bread and "Vollkornbrot," or dark bread. The white bread was in reality not white but grey in color. It was made of whole wheat flour containing 5 percent potato starch and 15 percent whole rye flour. The exact ingredients and preparation of bread in the ration period could not be determined definitely but water, not milk, undoubtedly was used in its preparation. Dark bread was prepared from whole rye flour.

The bread became progressively worse during the period from August 1941 to May 1942, especially after the ration reduction in April 1942 was announced, although it is believed that no sawdust was added to bread during this time. All the bread was soggy in texture. Especially after April 1942, the bread was darker in color, more moist, and the dark rye bread had a bitter taste.

According to the residents of Germany there had been little change in the "Zwieback", "Knaeckebrot", and "Schwarzbrot". The latter is made of relatively unmilled cereal grains. Knaeckebrot and Zwieback are quite pleasing to the taste; the former is made from rye flour and the latter from wheat flour. These forms of bread were not consumed to a great extent in Germany because of restrictions. It is not known whether the bread was fortified. In April 1942, it was announced that more of the hull of the grain and bran was to be mixed with the flour, causing the bread to be darker. During the period from December 1941 to April 1942, the 2,250 gm. per week of bread for the average worker was divided as follows: 950 gm. of white bread or 750 gm. of flour, 200 gm. of cake or white bread, and 1,100 gm. of dark bread. The proportion for other workers was the same. From April 1942 to October 1942, one-fifth of the 2,000 gm. weekly bread ration could be purchased as "Feinbaeckerei" (white bread, rolls, cake, pastry, Zwieback and Knaeckebrot) and four-fifths as dark bread.

From December 1941 to April 1942, one-third of the 400-gm. weekly meat ration had to be given up if the meat had no bones. The purchase of 200 gm. as meat or wurst was optional. From

April 1942 to October 1942, the 300-gm. ration included the weight of the bones. Pork was more readily available than beef or veal. Lamb, mutton, rabbit, venison, chicken, and goose were occasionally obtainable. During the early part of the war, game could be purchased at times without food coupons but about the middle of 1941 this was stopped. The wurst, since it lacked the spices used in peacetime, was not very palatable and some varieties contained a large proportion of gelatin. A sausage known as "bratling", made with skimmed milk and soybean, is said to form a mainstay of the German Army ration.[2]

From December 1941 to April 1942, the 269 gm. of fat allowed weekly for the average worker was divided as follows: 116.0 gm. of butter, 62.5 gm. of margarine, 37.5 gm. of pork fat, and 53.0 gm. of cooking vegetable oil. The proportion of the different fats for the other classes and for the other rationing periods was approximately the same.

After January 15, 1941, the margarine was fortified by a concentrate of vitamins A and D made from the livers of tuna, halibut, red perch, cod, and whale. One cc. of the concentrate was added to 10 kg. of margarine. The Germans claim that this fortification makes the margarine equivalent to butter.

From April 1942 to October 1942, 312.5 gm. of "ersatz" coffee were allowed for each 4-week period, except to children under 3 years of age (since October 1942, coupons for 248 gm. have been issued). The "coffee" was parched whole grain, usually barley, which was ground and prepared as coffee—making a brew which together with skimmed milk and a little sugar has only its warmth to make it palatable.

A large part of the marmalade was said to consist partly or wholly of turnips with artificial coloring and flavor added, making a preparation that was very unpalatable.

No official figures were obtainable for the number of people in the various groups that were rationed. The estimates, including the Saar, Austria, and Sudetenland, were as follows: 8 million up to 6 years of age, 10 million 6 to 14 years of age, 7 to 8 million workers doing heavy work, including 2 million engaged in the heaviest labor, 10 to 12 million self-providers, and 30 to 40 million average workers.

The self-providers in the above group were the farmers and their families. These people were allowed food in proportion to their age and the amount of work done; what they produced above this had to be sold to the State. However, the farm group was probably the best fed in Germany. There were opportunities, of which the farmers took advantage, for holding out food above what they were allowed for self-consumption. On meatless days eggs could be

[2] Wilder, R. M., and Keys, T. E.: Unusual foods of high nutritive value. J. Am. Med. Assoc., 120: 529–535 (Oct. 17, 1942).

TABLE 1.—*Amount of foods in grams per week for German civilians* [1]

[H. W., heavy worker; V. H. W., very heavy worker; N. W., night or overtime worker; N. C., normal consumer (average worker); AD, adolescent; CH, child]

Class	September 1939 to December 1941	December 1941 to April 1942	April 1942 to Oct. 19, 1942	Oct. 19, 1942 [2]	1937, estimated consumption [3]
			Bread		
CH, under 3	1,100	1,100	900	1,100	2,880
CH, 3-6	1,100	1,100	1,200	1,200	
CH, 6-10	1,700	1,700	1,700	1,700	
CH, 10-20	2,600	2,600	2,600	2,600	
Over 20, N. C	2,400	2,250	2,000	2,250	
N. W	2,850	2,850	2,600	2,850	
H. W	3,800	3,850	3,400	3,650	
V. H. W	4,800	4,650	4,400	4,650	
			Fats		
CH, under 3	125.00	125.00	125.00	125.00	498.00
CH, 3-6	127.00	188.00	188.00	188.00	
CH, 6-14	258.75	266.00	266.00	265.00	
AD, 14-18	305.75	301.00	269.00	265.00	
Over 18, N. C	298.75	269.00	206.00	200.00	
N. W	298.75	289.00	226.00	220.00	
H. W	394.00	394.00	300.00	300.00	
V. H. W	740.00	738.00	573.00	570.00	
			Sugar		
All classes	337.5	290.0	225	225	461
			Meat		
CH, under 6	281.25	250	150	200	893
CH, 6-18	531.25	400	350	400	
N. C	531.25	400	300	350	
N. W	631.25	600	450	550	
H. W	1,031.25	800	600	700	
V. H. W	1,281.25	1,000	650	950	
			Cheese		
All classes	(4)	(4)	(5)	(6)	104
			Marmalade		
All classes	175	175	175	175	----------
CH, 6-14	175	175	175	225	----------
			Milk (liters of whole milk)		
CH, under 3	5.25	5.25	5.25	5.25	----------
CH, 3-6	3.50	3.50	3.50	3.50	----------
CH, 6-14	1.75	1.75	1.75	1.75	----------
Over 14 (skimmed milk only)	3.50	3.50	0.87	(7)	----------
Nursing mothers and men in unhealthy occupations	3.50	3.50	3.50	3.50	----------

[1] Obtained partly from records of American Embassy.
[2] From data supplied by Office of War Information.
[3] These figures are not strictly comparable to the rest since they were obtained only by division of the available food supplies by the number of people and do not show the waste that occurs in handling the food.
[4] 31.25 each of cottage cheese and other cheese.
[5] 31.25 of cottage cheese and 47 of other.
[6] 30.0 cottage cheese and 30.0 other.
[7] Local rationing.

purchased in the rural sections, whereas in the large cities eggs were seldom seen.

The Jews were denied many of the food essentials which the Germans obtained. Jews were not allowed to purchase fresh or dried fruit, marmalade, sweets, cheese, fish, poultry, or game and could buy at the stores only in the afternoon when the best available food had been purchased.

Practically all the German people were able to get more food at times than they were officially allowed, although it is difficult to estimate the amounts. People often received food from relatives in the country. A black market also existed where supplemental food could be purchased for high prices. A pound of coffee, for example, cost in the neighborhood of 80 marks, or about $30, at the official rate of exchange before the entry of America into the war. The penalties for any illegal dealing in food were very severe. Every day announcements of executions for this offense appeared in the German papers.

The ration appeared to favor large families and the groups which sustain the agriculture, military, and industrial effort of Germany. The "white-collar" class or normal consumer had a considerably reduced ration while the laborers, children, and rural population had a relatively larger food allowance.[3]

Self-medication with vitamin preparations was not so widespread in Germany as in America, although it is increasing. According to Professor Wirts, the diet supplied the average adult with only 150 mg. of vitamin C per week. In 1940, 5,600,000 tablets of vitamin C (Cebion, trade name) were obtained. A tablet was given daily to infants, mothers, and women past the sixth month of pregnancy. Miners were to be given 14 tablets a week; 12 was estimated as sufficient to supply the weekly need. The tablets were to supply 200 mg. of vitamin C a week.

According to another report obtained on May 10, 1941, workers in the iron and nonferrous metal industries were receiving synthetic C and B vitamins, although the amounts were not stated. Miners received lemon juice. It was also announced that school children, infants, nursing mothers, and pregnant women were given vitamin D as well as C.

The German Government apparently recognized officially that supplementing the ration was necessary for certain classes of the population.

No opportunities were afforded the writers to make detailed examinations of German civilians. However, a number of persons who were questioned complained of loss of weight, constant hunger, easy fatigableness, digestive difficulties, and irritability. The monotony

[3] See footnote 1.

and tastelessness of the diet was probably an important factor in the declining morale of the German civilians.

Children and infants seemed to be better nourished than adults and played with the same zest that one observes in children everywhere.

There is considerable doubt about the accuracy and reliability of statistics and reports issued by the German Government on the health of the people since the institution of rationing. Figures appearing in the Reich's Gesundheitsblatt (Berlin, November 25, 1942) and comparing the incidence of infectious diseases for the first 42 weeks of 1942 with the same period for 1941 show increases in tuberculosis, diseases of childhood, typhoid fever, typhus fever, and dysentery. In November 1941, it was stated that infant and maternal mortality were about the same as before the war but that there was an increasingly poor condition in the teeth of the people.

DIET IN OCCUPIED COUNTRIES

Incomplete figures were obtained for the food ration in the occupied countries. A waiter in the former Polish town of Posen near the former German-Polish border gave the information that a family of four with two children under the age of 16 received the following weekly ration per person:

Meat—200 gm.
Bread—2,250 gm.
Sugar—125.0 gm.
Rolled oats, dried peas, dried beans, etc.—150 gm.
Fats—none.
Cheese—62.5 gm.
Potatoes—unrationed.
Fresh vegetables and milk—none.

These figures were obtained in October 1941, and the ration has probably been scaled down since that time. However, the Poles in rural areas and in small towns were often able to buy vegetables, fruit, meat, and poultry from the Polish farmers. In fact, the Poles traded such articles with the British prisoners of war in a camp near Thorn in the former Polish Corridor for tea, coffee, and chocolate which the British received in their Red Cross parcels. The quantities of food allowed the Poles and Jews vary in different localities.

In occupied France the food allowance was rather liberal for several months after the German occupation. However, the ration was scaled down and even the small amounts allowed were at times unobtainable. As in Germany, the farmers were able to keep more food than allowed by the authorities, and small amounts of this "bootleg" food could be obtained occasionally. A black market existed in France where food could be purchased. The illicit buying of food was naturally limited to a few people with money.

The bread in occupied France was not standardized as in Germany; it varied considerably in color and texture. Little wheat or rye

TABLE 2.—*Amounts of food, in grams per week, for French civilians about December 1942* [1] *(see table 1 for meaning of abbreviations)*

Class	Meat U. C.[2]	Meat R. C.[2]	Bread	Fats	Milk (liters of whole milk)	Sugar
CH, under 3	250	180	700	70	5.25	300
CH, 3-6	250	180	1,400	70	5.25	125
Old people	250	180	1,400	70		125
CH, 6-13	250	180	1,925	70	1.75	125
AD, 13-21	337	267	2,450	70		125
N. C	250	180	1,925	70		125
H. W	355	285	2,450	145		125
Miners	525	525	4,200	220		125
V. H. W	465	390	2,450	220		125
Expectant and nursing mothers	250	180	1,925	70	3.50	125

Cheese—all classes, 50. Alimentary pastes—all classes, 60.
Rice—CH under 3, 75; CH 3-6, AD, and old people, 30.
Wine—N. C., 1 liter; H. W., 2 liters; V. H. W., 3 liters.
Chocolate—CH 3-6, AD, and old people, 30.
Potatoes, fruit, vegetables, fish, poultry, and skimmed milk—locally rationed.
1 or 2 eggs a month can occasionally be purchased.

[1] From data supplied by the Office of War Information.
[2] U. C., urban communes; R. C., rural communes.

was available and a large proportion of buckwheat was used. Yeast was difficult to obtain.

Food in the Protectorate of Bohemia-Moravia was rationed in about the same quantities as in Germany since October 1942. Belgium was on about the same ration as France; that in Holland was about midway between France and Germany. Italy's ration was roughly one-half to three-quarters of that in Germany. Rationing was not as strict in Denmark as in Germany. In all of the occupied countries the supply of food probably was seldom sufficient to allow each person to obtain his rationed share.

THE DIET IN THE PRISONER-OF-WAR CAMPS

There are millions of prisoners of war in Germany at the present time. According to the figures of the prisoner-of-war section of the American Embassy, the British numbered about 63,000 and the Belgians about 80,000 up to December 7, 1941. There were no official figures available for the Russians, French, Yugoslavs, Poles, and Dutch.

The writers visited many of the British and Belgian prisoner-of-war camps during the period from August to December 1941. The diet in these camps for prisoners who did not work was about the same as the German "normal consumer" ration. Extra food was allowed for prisoners who performed hard work. However, many of the prisoners, especially the Belgians, worked on the German farms where, according to their own statements, the amount of food furnished was greater than that which the men in the camps received. In addition, the British were being sent one Red Cross package per week; the Belgians and French received packages less regularly.

TABLE 3.—*Typical menu for British and Belgian prisoners of war (Reserve Lazaret Rottenmuenster). Amounts in grams per person*

Day	Noon meal		Evening meal		Breakfast	
Tuesday, Oct. 21, 1941	Beef	60	Cheese	125	Tea [1]	4
	Cabbage	400	Potatoes (unpeeled)	400	Sugar	20
	Turnips	250	Tea	4	Marmalade	25
	Potatoes	400	Sugar	20	Bread [2]	325
	Pork fat	3				
	Salt	12				
	Soybeans	6				
Wednesday, Oct. 22, 1941	Carrots	250	Pork	30	Tea	4
	Cabbage	400	Mushrooms	20	Sugar	20
	Potatoes	400	Potatoes	400	Honey [3]	20
	Peas	55	Butter or margarine	40	Bread	325
	Pork fat	3	Mustard	---		
	Salt	12				
	Soybeans	6				
Thursday, Oct. 23, 1941	Beef	30	Corn meal	25	Tea	4
	Pork	30	Potatoes	300	Sugar	20
	Noodles	90			Butter or margarine	40
	Pork fat	3			Bread	325
	Salt	12				
Friday, Oct. 24, 1941	Codfish	100	Rolled oats	25	Tea	4
	Potatoes	400	Potatoes	400	Sugar	20
	White beans	75	Pork fat	3	Marmalade	25
	Rye flour	10			Bread	325
Saturday, Oct. 25, 1941	Pork	60	Cottage cheese	125	Tea	4
	Beets	400	Potatoes	400	Sugar	20
	Potatoes	400	Butter or margarine	40	Honey	20
	Pork fat	3			Bread	325
Sunday, Oct. 26, 1941	Beef	60	Sausage	60	Tea	4
	Potatoes (mashed)	400	Tea	4	Sugar	20
	Rye flour	10	Sugar	20	Marmalade	25
	Pork fat	3			Bread	325
	Salt	12				
	Soybeans	6				
Monday, Oct. 27, 1941	Beef	25	Rice	25	Tea	4
	Pork	25	Potatoes	400	Sugar	20
	Potatoes	400			Honey	20
	Butter or margarine	40			Bread	300
	Mushrooms	20				
	Salt	12				
	Soybeans	6				
Tuesday, Oct. 28, 1941	Pork	30	Potatoes	400	Tea	4
	Cabbage	300	Turnips	250	Sugar	20
	Carrots	200			Marmalade	25
	Turnips	250			Bread	325
	Peas	55				
	Potatoes	400				
	Pork fat	3				
	Soybeans	6				
Wednesday, Oct. 29, 1941	Beef	20	Cheese	125	Tea	4
	Pork	20	Potatoes	400	Sugar	20
	Mushrooms	20	Rye flour	10	Honey	20
	Potatoes	400	Pork fat	3	Bread	325
Thursday, Oct. 30, 1941	Noodles	60	Butter or margarine	40	Tea	4
	Potatoes	300	Potatoes (unpeeled)	400	Sugar	20
	Carrots	300	Tea	4	Marmalade	25
	Pork fat	3	Sugar	20	Bread	325
	Salt	12				
	Soybeans	6				
Friday, Oct. 31, 1941	Codfish	100	Barley	25	Tea	4
	Potatoes	500	Sausage	60	Sugar	20
	Rye flour	10			Honey	20
	Pork fat	3			Bread	325
	Salt	12				

[1] All tea is peppermint.
[2] All the bread is made of whole rye flour.
[3] All the honey is artificial.

It was determined by questioning the prisoners (when no Germans were present) that generally they were given what their menus called for. Occasionally substitutions were made, but an equivalent amount of the same type of food was supplied.

No opportunity was afforded to examine these men thoroughly for deficiencies. However, in the British camps especially, the men played

football and other games constantly. Only in one group was any deficiency disease seen. There were about 75 cases of beri-beri among a group of British soldiers and sailors captured in the Greek and Crete campaigns. These men had been in hospitals or prisoner-of-war camps in Athens and Salonika for 4 or 5 months before being transferred to Germany. Not only did deficiency diseases occur among the British in Greece but there were epidemics of dysentery, typhoid fever, and malaria. The British physicians had difficulty in obtaining parenteral and oral preparations of thiamine for treatment of the beri-beri cases, although in November, 2 months after the cases were first seen, many had recovered.

During their first winter of captivity, there were many cases of diphtheria, dysentery, acute nephritis, tuberculosis, chronic leg ulcers, and skin infections among men who were taken prisoners in France and Flanders.

A few Russian prisoners of war were seen in these camps. Their diet was found to be far poorer than that of the other prisoners. No exact figures could be obtained but enough facts to substantiate this were gathered from the statements of the prisoners who could speak a little German and from unguarded remarks made by German officers and civilians. One German officer stated that many of the Russians had swollen legs and feet. The writers believe this condition to have been due to beri-beri. All of the Russian prisoners were pitifully thin and many had protruding abdomens.

DIET AND EXAMINATION OF THE AMERICANS INTERNED AT BAD NAUHEIM

On December 14, 1941, the American diplomatic group in Berlin, together with the newspaper correspondents, were taken to Bad Nauheim and interned there until May 12, 1942. This group consisted of 135 persons. While there, they were given approximately the same food as the average German worker during the period December 1941 to April 1942. The exact amounts could not be determined, as the German authorities refused to furnish a record of the amounts allowed for each person, and no scales were available for weighing the food. In addition, each person received from the Embassy Commissary in Berlin the food listed in table 4.

About 15 persons had small supplies of vitamin preparations of various kinds which they took while interned. In the last month of the internment period, a supply of eggs, bacon, and butter was obtained from Denmark. This was distributed to the 6 children present and about 10 people who were ill. Some of the persons interned had brought small amounts of food with them from Berlin. The total amount of food available to this group was thus greater than that given the average German worker.

TABLE 4.—*Supplemental food per person furnished internees at Bad Nauheim*

Canned soup:		Condensed milk	1.9 tin.
Pea	0.3 can.	Tuna fish	0.2 tin.
Tomato	1.7 can.	Brown bread	0.2 tin.
Clam chowder	0.6 can.	Saltina crackers	1.2 tin.
Chicken	1.1 can.	B & M beans	0.2 tin.
Vegetable	1.0 can.	Campbell's beans	0.6 tin.
Mushroom	0.6 can.	Pineapple	0.2 tin.
Butter	1.0 1-lb. can.	Pears	0.4 tin.
Peanut butter	3.3 1-lb. jar.	Apricots	2.0 tin.
Crisco	0.3 lb.	Yellow cling peaches	1.0 tin.
Vienna sausage	4.4 tin.	Dried apricots	0.3 pkg.
Salmon	0.9 tin.	Fruit salad	0.9 tin.
Corned beef	2.3 tin.	Orange juice	1.2 tin.
Spam	0.5 tin.	Grapefruit juice	1.7 tin.
Bacon	0.8 lb.	Tomato juice	3.4 tin.
Lamb stew	0.3 tin.		

Before the war the diplomatic group had lived on a diet similar to that of the average American. They were given a ration about three times that of the average German worker; they received butter, eggs, bacon, ham, and poultry from Denmark; and tinned and boxed food was available in the Embassy Commissary. The newspaper correspondents had received the ration of the Germans doing the heaviest work.

The food was from the first tasteless and unpalatable. Vegetables were invariably boiled with a little salt and served with the addition of a small amount of flour. Nothing was properly seasoned; the same was true of the food served to the German civilians. It was observed, however, that the Americans tolerated the diet less well than the Germans did, probably because the Americans had been placed abruptly on a reduced ration, while that of the Germans had been scaled down gradually. Quite often members of the American group refused to eat certain food because of distaste or resulting abdominal discomfort. An especially notorious offender was "griesmehl", a form of corn meal moistened with water and fried in a very small amount of fat.

In April 1942, after about 4 months of internment, because of many complaints of bloating, irritability, loss of weight, fatigue, etc., by individual members of the group, the writers decided to examine each member of the group who would consent to the examination. Few facilities were available; no laboratory work was possible and a history and physical examination, with special attention to signs of vitamin deficiency, constituted the extent of the examination. Of the 135 persons interned, 111 were examined. The age range was from 2 to 59 years; four-fifths were in the age group 20 to 50 years. The results of the examinations are tabulated in table 5.

The average weight loss for the group was 8.8 pounds per person, 10 pounds for the men and 6.7 pounds for the women. These figures do not include 18 of the group on whom no previous figures were available.

The weight change for the men, varying from a loss of 34 pounds to a gain of 9 pounds, showed that 54 men lost weight, 6 gained weight, 2 showed no change, and 8 did not know but 5 thought they had lost weight.

TABLE 5.—*Results of examinations of internees at Bad Nauheim*

Symptoms	Number of persons	Signs	Number of persons
Fatigue	30	Cheilosis	3
Sore mouth and tongue	2	Stomatitis	1
Nervousness and irritability	15	Spongy, bleeding gums	9
Night blindness	2	Anemia (clinical examination only)	9
Burning and itching of eyes	2	Conjunctivitis	2
Sore, bleeding gums	6	Dryness and thinness of mucosa of lips and skin, and brittleness of nails	34
Mouth lesions	8	Seborrheic dermatitis of face	2
Constipation	15		
Flatulence, gas pains, and passage of much flatus	39		

The weight change for the women, varying from a loss of 16 pounds to a gain of 7 pounds, showed that 21 women lost weight, 5 gained weight, 5 showed no change, and 10 did not know but 3 thought they had lost weight.

The previous weights of all persons examined were determined by asking each one what his weight had been before internment and are therefore, in some cases, unreliable. However, most of the group had been keeping a record of their weight.

The first few weeks many persons complained of constant hunger but later the hunger pains became less acute. Three persons complained of gingivitis soon after the outbreak of the war. They had been living in Germany and one claimed that he had received only the German civilian ration during that time. Two people had ichthyosis which was intensified during their internment. A common complaint was a craving for fat. The small amount of bacon obtainable was either eaten raw or was fried and the grease carefully saved to spread on bread. Crisco was eaten the same way with a little salt. The symptoms of nervousness, irritability, and fatigue in some cases were probably caused by confinement alone.

The activities of all members of the group were greatly restricted during the period of internment so that their exertions were less than those of the average "white collar" worker. The only exercise that most of this group took was walking up and down several flights of steps to meals.

One case of pulmonary tuberculosis developed during the internment period. Five cases of stomatitis with numerous herpetic lesions occurred. The first symptoms were malaise, an elevation of temperature ranging from 38.0° to 40.0° C., and bilateral cervical lymphadenitis. Within 1 to 3 days the gums became red and swollen. This was followed by the appearance of numerous small, shallow ulcers

with whitish bases on the gums, tongue, labial mucous membrane, and pharynx. The mouth and throat became very painful and eating and swallowing were difficult. The cases appeared to run a self-limited course of 8 to 10 days, the ulcers healing and the temperature dropping gradually.

From this rather superficial examination it was evident that a diet considerably better than the diet of the German civilians was inadequate to maintain weight and a sense of well-being among the interned Americans.

SURVEYS OF MILK LABORATORIES IN WAR AREAS IN THE UNITED STATES [1]

III. OBSERVATIONS ON SAMPLING AND HEALTH DEPARTMENT PRACTICE RELATIVE TO BACTERIOLOGICAL MILK ANALYSIS

By LUTHER A. BLACK, *Senior Bacteriologist, United States Public Health Service*

PROCEDURE

In preceding papers (*1*, *2*) summaries were presented of methods used in bacteriological analysis of milk in 408 municipal or State laboratories surveyed in the 48 States. The general plan of procedure, forms used, and extent of the survey were discussed therein. In this last paper of the series, a similar detailed analysis has been prepared of the deviations observed relative to the requirements of Standard Methods on sampling, certain requirements of health department practice pertaining to milk analysis in communities operating under the Milk Ordinance and Code recommended by the United States Public Health Service, and certain miscellaneous information pertaining to quarters and laboratory facilities, the lack of which, though not included in Standard Methods, might conceivably affect the accuracy of the results.

In the interest of clarity, the figures presented in the following tables list only *deviations*, items *undetermined* because of local conditions at the time of the survey, or items *not used* in the particular laboratory. Thus common deviations may be readily singled out; some of these will be discussed briefly.

The original survey forms based on the seventh edition of Standard Methods were used in 116 surveys from September 1941 until January 1942; thereafter revised forms, based on the eighth edition, were used for the remaining 292 laboratories surveyed. In the revised form the material on sampling, health department practice, and miscellaneous information was brought together on one page, and a few items found desirable by experience were included in addition to those originally listed. In preparing the tables for this paper, the survey results

[1] From the Sanitation Section, States Relations Division.

recorded on the earlier forms were tabulated upon the present forms. This resulted in unduly large figures under *undetermined* in the case of items not included on the original form. Likewise, the later surveys included a few additional items, which were marked either *undetermined* or *not used* when transferring the earlier surveys to the revised forms.

EXTENT OF OBSERVATIONS

A summary indicating the extent of the observations made is presented in table 1, arranged by the same geographic divisions as in the preceding papers. Quite often no individual responsible for collection of the samples was available at the time of the laboratory survey; consequently, information on sampling was obtained and recorded at only 261 of the 408 laboratories surveyed. Health department practices suggested in the Milk Ordinance and Code recommended by the United States Public Health Service were observed at only 149 laboratories, as this ordinance was not in effect in the six New England and three Middle Atlantic States, and elsewhere the laboratories were sometimes located at places other than the health department. The material pertaining to quarters and facilities, not being required by Standard Methods, was not a part of the original survey forms, and such observations were not recorded routinely in the earlier surveys; however, 334 records were made for the 408 laboratories surveyed.

TABLE 1.—*Milk laboratories surveyed*

Geographic divisions [1]	Total	Observations made on—		
		Sampling	Practice	Quarters, etc.
New England (6)	30	1	0	0
Middle Atlantic (3)	20	3	0	0
East North Central (5)	32	23	5	12
West North Central (7)	115	101	68	116
South Atlantic (9)	60	36	23	58
East South Central (4)	19	13	5	16
West South Central (4)	33	24	25	33
Mountain (8)	41	22	13	41
Pacific (3)	58	38	10	58
Total	408	261	149	334

[1] Figures in parentheses indicate number of States included. The District of Columbia is counted as a State.

SAMPLING

The requirements of Standard Methods pertaining to sampling, and a summary of the results showing deviations from Standard Methods, are listed in table 2 by geographic divisions with the totals for all States. Nearly one-fourth of the laboratories definitely failed to make bacteriological examinations of retail cream, and in a considerable number of other places it was not determined whether such examinations were made. In a number of instances samples were not collected

from the delivery vehicle but were taken from the plant or from retail stores. It was rather common practice to sample only one size of retail container. Nearly one-third of the laboratories failed to collect samples from each size of container or of a representative percentage of each size of container, as stipulated by Standard Methods; in a considerable number of additional instances this item remained undetermined. As shown in table 2, less than 20 percent of the laboratories protected the caps and lips of retail samples with suitable waterproof covering in transit to the laboratory.

In collecting samples from producers there were several instances where the milk was intentionally not mixed before sampling, and in other instances this item could not be determined. It was impossible to determine whether or not stirrers were sterilized satisfactorily before use, hence the large number in the *undetermined* column for this detail. In part this was due to rather common use of chlorine or hot water for practical sterilization of such sampling equipment at the plant with universal failure to comply with the requirement of Standard Methods that, where such means are used and plate counts are made on such samples, the laboratory should "Plate samples of the rinse and sterilizing solutions each day when sampling is completed." In a number of instances samples were collected in containers that were not leakproof or the sterilization of which was questionable, or directly into smaller milk bottles available at the plant, either without further treatment or sometimes after rinsing in a chlorine solution. Sample bottles were sometimes filled to the top, rendering thorough agitation more difficult and not complying with the Standard Methods requirement to "Avoid filling the container more than two-thirds full." The practices in taking samples usually were not actually observed, and the notations were based largely on the procedure described by the local milk inspectors taking such samples, together with such corroborative evidence available in the laboratory as sampling equipment, the samples themselves, and past records. Where any doubt existed this detail was noted as *undetermined*, thus accounting for the larger numbers of items so recorded.

Cooling of the samples was generally practiced. There was some doubt that sample containers had "compartments or baffles to hold the sample containers in a vertical position," as specified by Standard Methods. Most places did not "test each lot of samples and record the observed temperature on the analysis report," and since this is stipulated as desirable "where conditions under which samples are received vary from day to day," this item was marked *not used* in many instances.

Identification of the samples was generally well done. Many laboratories failed to record the time of analysis, however, and many

TABLE 2.—*Summary of items pertaining to sampling, indicating lack of conformity with Standard Methods for the Examination of Dairy Products (eighth edition)*

	Total			New England			Middle Atlantic			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories observed	261			1			3			23			101			36			13			24			22			38		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
1. Collection—authorized control officials	3	18	----	0	----	----	0	----	----	----	2	----	3	5	----	0	----	----	----	4	----	----	2	----	----	3	----	----	2	----
Each 6-month period at least 4 samples on separate days*	15	15	5	0	----	----	0	----	----	----	1	----	14	4	5	0	----	----	----	4	----	----	2	----	1	2	----	----	2	----
Milk	1	14	----	0	----	----	0	----	----	----	1	----	1	3	----	0	----	----	----	4	----	----	2	----	----	2	----	----	2	----
Cream	59	43	3	0	----	----	1	----	----	5	2	----	24	23	1	14	3	2	1	5	----	5	3	----	8	3	----	1	4	----
Each farm*	9	26	13	0	----	----	1	1	----	----	3	----	3	6	10	1	1	2	----	6	----	----	2	----	4	4	----	----	3	1
Immediately after delivery	6	30	14	0	----	----	----	1	----	----	2	----	2	12	10	----	1	3	----	6	----	----	2	----	4	4	----	----	2	1
Each plant*	----	14	----	0	----	----	0	----	----	----	1	----	----	3	----	0	----	----	----	4	----	----	2	----	----	2	----	----	2	----
From delivery vehicle	18	65	----	0	----	----	----	1	----	----	2	----	13	38	----	1	2	----	----	4	----	2	4	----	1	3	----	1	11	----
Satisfactory transportation of samples	1	39	----	0	----	----	0	----	----	----	4	----	1	18	----	----	1	----	----	4	----	----	6	----	----	4	----	----	2	----
A. Retail: from or of representative percentage of each size	77	51	1	0	----	----	0	----	----	----	2	----	48	36	1	12	3	----	2	----	----	6	1	----	6	5	----	3	4	----
Original unopened container	----	2	1	0	----	----	0	----	----	0	----	----	----	2	1	0	----	----	0	----	----	0	----	----	0	----	----	0	----	----
Protect caps and lips by suitable waterproof covering	193	16	3	1	----	----	2	----	----	11	3	----	83	6	2	25	1	----	4	----	----	18	2	1	15	3	----	34	1	----
B. Wholesale: previously unopened container**	6	33	25	----	1	----	----	1	----	5	9	----	----	8	16	----	3	3	1	3	----	----	1	----	----	3	5	----	4	1
Agitate vigorously by stirring (or repeated inversions)	18	48	26	0	----	----	----	1	----	----	7	----	6	17	16	3	4	3	----	3	----	3	2	----	----	4	6	6	10	1
Satisfactory sterilization of stirrer	5	144	40	0	----	----	----	2	----	----	17	----	2	67	24	1	8	5	----	5	----	----	12	2	----	9	6	2	24	9
Use sterile suitable metal or glass sampling tubes properly, or mix well and immediately dip or catch	7	33	25	0	----	----	0	----	----	----	5	----	2	12	16	2	4	3	----	3	----	----	1	----	2	3	5	1	5	1
Handle container and caps aseptically	----	78	25	0	----	----	0	----	----	----	23	----	----	21	16	----	10	3	----	13	----	----	4	----	----	3	5	----	4	1
Not less than 10 ml. sample	----	22	26	0	----	----	0	----	----	----	5	----	----	4	17	----	2	3	----	3	----	----	1	----	----	3	5	----	4	1
Sterile suitable leakproof container	43	41	26	0	----	----	0	----	----	4	6	----	23	13	17	9	3	3	----	3	----	2	6	----	2	4	5	3	6	1
Avoid filling over two-thirds full	39	37	26	0	----	----	0	----	----	----	4	----	25	12	17	4	7	3	----	3	----	5	3	----	5	4	5	----	4	1
2. Cooling—promptly to below 50° F.	5	31	6	0	----	----	0	----	----	----	4	----	----	9	5	1	5	----	1	1	----	3	2	----	----	6	1	----	4	----
Storage below 50° F. (below 45° F. unless analyzed within 4 hours)	7	19	----	0	----	----	0	----	----	----	3	----	4	8	----	----	2	----	1	----	----	2	----	----	----	2	----	----	4	----
Provide compartments or baffles to hold containers vertical	28	113	3	0	----	----	0	----	----	----	23	----	20	44	1	1	15	2	----	13	----	4	8	----	2	5	----	1	5	----
Bacteriological sample removed before inserting thermometer	1	56	2	0	----	----	0	----	----	----	23	----	----	4	1	1	9	1	----	13	----	----	2	----	----	2	----	----	3	----

(Desirable) where conditions vary, test each lot	----	15	133	0	----	----	0	----	----	----	2	----	----	4	94	----	2	1	----	1	----	----	----	11	----	2	14	----	4	13
And record temperature	----	57	133	0	----	----	0	----	----	----	23	----	----	4	94	----	10	1	----	13	----	----	1	11	----	2	14	----	4	13
3. Identification—promptly identify legibly and indelibly	----	5	----	0	----	----	----	1	---	0	----	----	----	3	----	0	----	----	----	1	----	0	----	----	0	----	----	0	----	----
Official number or tag	12	55	4	0	----	----	1	1	----	2	2	1	2	43	1	1	3	----	1	2	----	2	2	----	2	1	1	1	1	1
Record time of sampling if interval before examination exceeds 4 hours	58	51	1	0	----	----	1	---	----	3	4	----	16	28	1	7	3	----	1	3	----	9	2	----	4	2	----	17	9	----

* Indicates modification required by P. H. S. Code.

** Weigh-vat samples satisfactory but usually not recognized for legal action.

De=Deviations. Un=Undetermined. No=Not used.

sample collectors failed to comply with the provision that "if the interval between sampling and examination exceeds 4 hours, record on the analysis report the time of sampling and the time of examination."

Ambiguous statements appear in Standard Methods relative to sampling, and clarification of some of these statements would make more readily apparent the intent and extent of its application.

HEALTH DEPARTMENT PRACTICE

Of the 408 laboratories surveyed in the 48 States, 149 of those analyzing supplies for communities operating under the Milk Ordinance and Code recommended by the United States Public Health Service furnished information relative to the practices used in handling and reporting bacteriological results. This material is tabulated in table 3 and shows deviations from the requirements. About one-fifth of the departments definitely did not follow the requirement of averaging the results of the last four consecutive samples taken on separate days, and in a somewhat larger number of instances compliance could not be determined. Similarly, one-fourth did not average bacterial counts by the logarithmic method, and in some instances this item remained undetermined. There was less deviation in record keeping, however. Lastly, there were a few places in which violations definitely were not followed up, and a larger number recorded as *undetermined* since this type of information was less readily obtainable.

Tests of containers were generally neglected. Only 11 of the 149 laboratories actually made tests, and one-half of the departments definitely violated this requirement, with others marked *undetermined* or *not used*. Still fewer laboratories analyzed samples monthly, as shown in table 3. Only two laboratories used a disintegration test on paper containers; many places, however, did not use such containers. Most of the 11 departments testing containers used standard technique and enforced the Public Health Service standards.

Neglect in testing the sterility of containers was the outstanding deviation from the requirements relative to health department practice.

TABLE 3.—*Summary of items pertaining to requirements under the United States Public Health Service Milk Ordinance and Code*

	Total			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories observed	149			5			68			23			5			25			13			10		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
Health department practice—counts from samples not published	1	23			5		1	1			9			5			2		0				1	
Average of results of last 4 consecutive samples on separate days used	31	38	1		5		18	11	1	7	8			5			6		4	2		2	1	
Averaging of bacterial counts done by logarithmic method (arithmetic average of reduction times for reductase test)	37	24	1		5		24	2	1	5	8			5		4	3		2			2	1	
Adequate records kept	15	13		0			6	7		6	2		0			1	1			2		2	1	
Ledger sheets for each dairy and plant	16	11		0			8	6		6	1		0				2		1	1		1	1	
Laboratory results and health examinations recorded	12	23	4		1		4	13	4	3	2		1			2	3			3		2	1	
Posted to date	23	12	4	0			15	5	4	3	1		0			1	3		3	1		1	2	
Violations followed up	9	96		0			7	48		1	11		0				20		1	9			8	
Tests of containers—rinse count made on bottles, cans, paper containers, caps, and covers	75	23	40		3		36	2	30	7	10	4		2		14	3	5	11	1	1	7	2	
Monthly samples	80	20	40		3		37		30	12	3	4		4		15	3	5	9	4	1	7	3	
Disintegration test on paper stock	14	15	118		5		8		60	2	4	15		3	2	2		22	1	1	12	1	2	7
Standard Methods technique	10	63	65		5		2	14	52	3	14			5		3	15	2		6	8	2	4	3
P. H. S. standards enforced	9	56	68		3		1	16	51	4	7	4		4		4	12	3		7	7		7	3

De=Deviations. Un=Undetermined. No=Not used.

TABLE 4.—*Miscellaneous information not required by Standard Methods*

	Total			East North Central			West North Central			South Atlantic			East South Central			West South Central			Mountain			Pacific		
Number of laboratories observed	334			12			116			58			16			33			41			58		
	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No	De	Un	No
Copy of Standard Methods available in laboratory	45	43			12		19	5		10	9			16		4	1		5			7		
Latest edition	161	48	9		12		47	1	8	32	16			16		18	3	1	28			36		
Quarters—floors clean	23	9		0			11	5		4			1			3	2		2	2		2		
Walls and ceilings smooth	11	13		0			9	8		1			0			1	1			2			2	
Doors and windows screened, or flies absent	1			0			1			0			0			0			0			0		
Rodents and insects absent	1	1		0			1	1		0			0			0			0			0		
Lighting adequate	8	20		0			7	15		0			0			1	1			4		0		
Ventilation adequate	1	12		0				6		0			0				2			4		1		
Free from drafts	9	82		1			2	34		2	2		0			2	7			18		2	21	
Free from dust	15	7		0			7	2		7	2		0			1	2			1		0		
Room temperature not extreme		1		0			0			0			0				1		0			0		
Daily cleaning	16	16		0			5	8		5	5		0			1	2		3	1		2		
Free from confusion	8	7		0			2	2		1	1		0			2	2		2	2		1		
Space adequate	23	38			1		8	10		6	6		0			5	2		3	11		1	8	
Used for laboratory purposes only	48	21		0			10	11		12	3		6			5	1		6	5			1	
Facilities—table space adequate	19	17		0			7	5		6	3		0			2	3		3	6		1		
Storage adequate	34	29		0			8	14		11	6		1			6	4		3	4		5	1	
Utilities adequate	5	6		0			4	5		1	1		0			0			0			0		
Cabinets, shelves, etc., clean	14	8		0			6	4		5	1		0			1	2		2	1		0		
Equipment neat and clean	9	3		0			5	1		3	1		0			1				1		0		
Clean outer garments worn	28	97		3	2		2	56		17	7		3			2	10			16		1	6	
Clothing stored outside laboratory or in closet	9	2		0			5	2		2			0			2			0			0		

De=Deviations. Un=Undetermined. No=Not used.

QUARTERS AND FACILITIES

In table 4 are presented tabulations of the miscellaneous information secured, especially relative to quarters and facilities, none of which is required by Standard Methods.

It is of interest to note that of the 334 laboratories for which such information was obtained, 45 definitely did not have any copy of Standard Methods, and in 43 additional instances possession was questionable. Some 161 did not have the latest edition.

In general, the quarters were adequate for the amount of milk analyzed. A small number of laboratories had unclean floors, had inadequate lighting, were dusty, were not cleaned daily, or were not free from confusion. In a larger number the space was not adequate, and in a considerable number of places the use of rooms was not restricted to laboratory purposes. A variety of quarters was used, ranging from a converted city jail cell or small room over the city abattoir (both cleaner and better painted, however, than many more typical laboratory quarters) to separate laboratory rooms originally built for such analyses.

The facilities in general were adequate for the amount of work being done in milk analysis. Some of the laboratories were lacking in proper storage facilities. The detail concerning "clean outer garments worn" was considered complied with by clean laboratory coats or aprons. While these are considered preferable, it was not the intention to discredit their absence by marking as a deviation; accordingly, in many cases this was recorded as *undetermined*, thus accounting for the larger number in the *undetermined*, column for this detail.

It is the author's opinion that failure to conform to some of the items listed under quarters and facilities had a direct relation to the accuracy of the results obtained, to say nothing of the psychological value of proper quarters. It would seem that certain minimum standards of laboratory housing might well be included in Standard Methods for the Examination of Dairy Products.

REFERENCES

(*1*) Black, L. A.: Surveys of milk laboratories in war areas in the United States. I. Practices observed in making agar plate counts. Pub. Health Rep., 58: 1605 (1943).

(*2*) Black, L. A.: Surveys of milk laboratories in war areas in the United States. II. Practices observed in making direct microscopic examinations and methylene blue reduction tests. Pub. Health Rep., 58: 1641 (1943).

INCIDENCE OF HOSPITALIZATION, AUGUST AND

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	August	
	1942	1943
1. Number of plans supplying data	63	71
2. Number of persons eligible for hospital care	8,889,867	10,821,657
3. Number of persons admitted for hospital care	91,467	109,425
4. Incidence per 1,000 persons, annual rate, during current month (daily rate x 365)	121.1	119.0
5. Incidence per 1,000 persons, annual rate for the 12 months ended Aug. 31, 1943	107.5	105.4
	September	
1. Number of plans supplying data	60	62
2. Number of persons eligible for hospital care	8,563,567	9,886,661
3. Number of persons admitted for hospital care	78,140	92,113
4. Incidence per 1,000 persons, annual rate, during current month (daily rate x 365)	1100.9	113.4
5. Incidence per 1,000 persons, annual rate for the 12 months ended Sept. 30, 1943	107.5	105.6

DEATHS DURING WEEK ENDED OCTOBER 30, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 30, 1943	Corresponding week, 1942
Data for 87 large cities of the United States:		
Total deaths	8,636	8,393
Average for 3 prior years	8,041	
Total deaths, first 43 weeks of year	380,683	353,104
Deaths under 1 year of age	628	692
Average for 3 prior years	598	
Deaths under 1 year of age, first 43 weeks of year	27,215	24,366
Data from industrial insurance companies:		
Policies in force	65,993,760	65,198,406
Number of death claims	12,418	11,834
Death claims per 1,000 policies in force, annual rate	9.8	9.5
Death claims per 1,000 policies, first 43 weeks of year, annual rate	9.7	9.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 6, 1943

Summary

A total of 193 cases of meningococcus meningitis was reported, as compared with 198 last week and a 5-year (1938–42) median of 32. States reporting 6 or more cases for the week (last week's figures in parentheses) are as follows: Massachusetts 7 (12), New York 42 (26), New Jersey 8 (6), Pennsylvania 14 (15), Ohio 9 (4), Illinois 14 (10), Maryland 6 (7), Kentucky 7 (4), Texas 9 (2), and California 7 (8). To date, 15,573 cases have been reported (nearly 58 percent more than the highest number recorded for any prior entire year of record), as compared with 2,970 for the same period last year and a 5-year median of 1,735. The cumulative total since the beginning of the fourth quarter of the present year is 1,045, as compared with 299 for the same period last year and a median of 164 for the corresponding periods of the past 5 years. In 1929, the year of highest recorded incidence, the comparable number was 505.

A further sharp decline was recorded in the incidence of poliomyelitis, a total of 259 cases being reported, as compared with 363 for the preceding week. The 5-year median is 207. The largest numbers were reported in California (59) and Illinois (23). Six other States reported 12 to 18 cases each. The cumulative total to date is 11,379 as compared with 3,624 for the same period last year and a 5-year median of 6,452.

The total numbers of cases reported for the week of influenza, measles, and scarlet fever are above the corresponding 5-year medians, while those of diphtheria, smallpox, typhoid fever, and whooping cough are below the medians.

Deaths recorded for the week in 89 large cities of the United States aggregated 8,611, as compared with 8,804 for the preceding week and a 3-year (1940–42) average of 8,192. The cumulative total for the first 44 weeks of the year is 396,734, as compared with 368,055 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended November 6, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Nov. 6, 1943	Nov. 7, 1942		Nov. 6, 1943	Nov. 7, 1942		Nov. 6, 1943	Nov. 7, 1942		Nov. 6, 1943	Nov. 7, 1942	
NEW ENGLAND												
Maine	1	1	1	1	------	------	64	0	30	3	2	0
New Hampshire	0	0	0	------	2	------	16	21	0	1	0	0
Vermont	0	0	0	------	------	------	19	104	8	1	0	0
Massachusetts	2	2	3	------	------	------	157	208	165	7	4	0
Rhode Island	3	1	1	------	------	------	22	0	0	1	1	0
Connecticut	1	0	1	2	3	2	14	49	37	2	1	1
MIDDLE ATLANTIC												
New York	9	13	16	[1] 4	[1] 9	[1] 9	135	126	128	42	13	2
New Jersey	1	5	10	7	10	6	182	19	17	8	2	1
Pennsylvania	8	13	15	3	3	------	143	190	112	14	3	2
EAST NORTH CENTRAL												
Ohio	15	31	31	2	11	11	386	26	26	9	2	1
Indiana	32	8	22	12	17	16	80	16	9	5	0	2
Illinois	9	40	30	2	8	8	39	38	31	14	1	1
Michigan [2]	10	7	7	4	------	------	232	152	71	5	1	1
Wisconsin	4	2	2	12	27	24	334	54	54	2	1	1
WEST NORTH CENTRAL												
Minnesota	9	6	4	------	3	1	407	3	9	2	2	1
Iowa	8	1	8	------	2	1	17	25	25	0	0	0
Missouri	3	5	13	------	------	5	6	9	5	1	1	1
North Dakota	1	3	3	4	------	------	109	1	4	0	1	0
South Dakota	7	9	3	------	------	------	68	0	3	0	1	0
Nebraska	3	14	2	1	1	1	3	47	3	1	0	0
Kansas	9	4	5	1	2	2	2	0	5	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	12	0	3	1	0	0
Maryland [2]	7	6	6	2	5	5	14	18	16	6	7	0
District of Columbia	0	1	2	------	1	1	5	0	0	2	1	0
Virginia	13	25	37	115	187	70	214	2	20	4	2	1
West Virginia	8	32	21	2	20	10	30	7	7	2	0	0
North Carolina	29	65	140	9	------	2	41	4	84	3	0	0
South Carolina	19	50	32	272	285	294	63	2	3	1	0	1
Georgia	25	25	34	25	38	20	11	1	2	1	1	1
Florida	8	8	8	3	3	2	26	2	3	2	0	0
EAST SOUTH CENTRAL												
Kentucky	12	16	18	5	5	5	5	14	14	7	2	2
Tennessee	16	8	27	30	17	14	8	18	6	2	1	1
Alabama	11	39	27	61	42	42	25	3	5	3	0	1
Mississippi [2]	12	17	17	------	------	------	------	0	------	5	1	0
WEST SOUTH CENTRAL												
Arkansas	5	19	19	11	31	41	2	2	2	0	0	0
Louisiana	6	14	14	3	2	2	2	0	1	5	0	0
Oklahoma	5	15	19	17	22	33	14	1	1	1	0	0
Texas	46	64	64	638	602	271	34	18	18	9	0	1
MOUNTAIN												
Montana	1	0	0	4	4	7	57	11	19	0	0	0
Idaho	0	0	0	------	------	------	0	28	27	0	0	0
Wyoming	0	0	0	4	45	1	7	4	4	0	0	0
Colorado	5	11	7	21	88	13	32	12	21	1	0	0
New Mexico	0	1	1	------	------	1	1	1	6	0	0	0
Arizona	2	4	4	113	26	57	8	4	4	2	0	0
Utah [2]	0	0	0	------	3	3	6	191	10	0	0	0
Nevada	0	0	------	------	5	------	9	6	------	1	0	0
PACIFIC												
Washington	3	6	5	------	3	------	26	205	20	4	3	1
Oregon	0	1	1	17	17	15	22	89	19	5	3	0
California	35	27	18	22	27	27	53	40	149	7	2	2
Total	403	619	633	1,429	1,576	1,065	3,162	1,771	1,750	193	59	32
44 weeks	11,115	12,408	12,662	92,654	91,272	157,887	554,188	476,152	476,152	15,573	2,970	1,735

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 6, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Nov. 6, 1943	Nov. 7, 1942		Nov. 6, 1943	Nov. 7, 1942		Nov. 6, 1943	Nov. 7, 1942		Nov. 6, 1943	Nov. 7, 1942	
NEW ENGLAND												
Maine	0	0	0	19	8	8	0	0	0	0	0	1
New Hampshire	2	2	0	9	12	2	0	0	0	0	0	0
Vermont	0	1	0	8	2	3	0	0	0	0	0	0
Massachusetts	8	0	2	140	182	80	0	0	0	8	7	2
Rhode Island	8	0	0	9	1	4	0	0	0	1	1	0
Connecticut	5	8	0	30	30	30	0	0	0	1	0	2
MIDDLE ATLANTIC												
New York	16	10	10	213	181	178	0	0	0	3	7	9
New Jersey	3	4	4	48	62	62	0	0	0	2	0	3
Pennsylvania	4	1	8	183	166	166	0	0	0	2	8	11
EAST NORTH CENTRAL												
Ohio	2	3	9	290	233	227	0	0	0	2	6	12
Indiana	1	2	2	72	42	51	1	2	2	1	2	2
Illinois	23	20	20	127	186	202	0	0	2	1	2	3
Michigan [2]	7	0	11	118	66	121	1	0	1	2	3	3
Wisconsin	8	4	4	152	179	125	0	0	0	1	0	0
WEST NORTH CENTRAL												
Minnesota	7	1	5	84	69	68	0	0	0	0	3	1
Iowa	2	2	2	61	55	55	1	1	1	0	0	2
Missouri	2	4	1	46	48	52	0	1	1	2	5	5
North Dakota	1	0	0	14	10	12	0	0	1	0	0	1
South Dakota	1	2	1	19	38	18	1	0	1	0	0	0
Nebraska	3	5	4	23	15	15	0	0	0	0	0	0
Kansas	8	4	2	80	49	60	2	0	1	1	0	2
SOUTH ATLANTIC												
Delaware	0	0	0	2	6	6	0	0	0	0	0	0
Maryland [2]	0	0	1	54	56	41	0	0	0	1	5	5
District of Columbia	0	0	0	9	14	10	0	0	0	0	0	1
Virginia	1	1	1	72	88	50	0	0	0	11	1	5
West Virginia	1	0	2	70	49	74	0	0	0	0	3	5
North Carolina	1	1	1	159	135	96	0	0	0	0	6	5
South Carolina	2	0	0	11	12	21	0	0	0	2	2	5
Georgia	0	0	1	30	41	30	0	0	0	9	1	7
Florida	1	1	1	13	7	7	0	0	0	6	3	2
EAST SOUTH CENTRAL												
Kentucky	2	2	5	68	64	64	0	0	0	1	5	12
Tennessee	0	0	0	59	59	59	0	0	0	1	1	7
Alabama	0	2	1	27	39	39	0	0	0	0	2	4
Mississippi [2]	0	2	0	14	24	14	0	0	0	3	1	1
WEST SOUTH CENTRAL												
Arkansas	0	3	2	3	11	14	0	0	1	1	2	9
Louisiana	3	2	1	8	9	8	0	0	0	1	4	5
Oklahoma	12	0	1	55	35	23	0	1	2	7	12	9
Texas	12	10	4	48	38	37	1	1	1	9	6	9
MOUNTAIN												
Montana	0	0	0	9	9	25	0	0	0	3	1	1
Idaho	0	0	0	16	4	10	0	0	0	0	0	2
Wyoming	0	0	0	6	0	5	0	0	0	0	0	0
Colorado	8	2	2	27	31	31	0	0	1	2	1	1
New Mexico	2	0	0	3	3	4	0	0	0	1	3	3
Arizona	1	0	0	27	2	2	0	0	0	0	2	2
Utah [2]	15	0	3	29	6	6	0	0	0	0	1	1
Nevada	0	0	0	2	1	0	0	0	0	0	0	0
PACIFIC												
Washington	15	2	1	100	39	38	0	0	0	1	0	1
Oregon	18	0	2	41	6	12	0	0	0	0	1	3
California	59	8	8	148	134	134	0	0	1	2	3	3
Total	259	105	207	2,860	2,556	2,556	7	6	25	88	110	182
44 weeks	11,379	3,624	6,452	116,334	105,407	133,540	655	689	2,114	4,910	6,111	8,581

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 6, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended Nov. 6, 1943	Whooping cough: Week ended Nov. 7, 1942	Whooping cough: Median 1938-42	Week ended November 6, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	33	50	27	0	0	0	0	0	0	0	0	0
New Hampshire	3	0	0	0	0	0	0	0	0	0	0	0
Vermont	29	22	22	0	0	0	0	0	0	0	0	0
Massachusetts	98	170	163	0	0	4	0	0	0	0	0	1
Rhode Island	35	24	20	0	0	0	0	0	0	0	0	0
Connecticut	65	80	80	0	0	2	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	254	405	426	0	0	25	0	0	0	0	0	0
New Jersey	81	158	158	1	1	1	0	0	0	0	0	0
Pennsylvania	167	334	330	1	0	6	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	116	124	131	0	0	1	0	0	0	0	0	0
Indiana	28	29	19	0	0	0	2	0	0	0	0	0
Illinois	130	217	173	0	0	1	0	0	0	0	0	0
Michigan [2]	122	155	192	0	0	7	0	0	0	0	0	0
Wisconsin	193	151	174	0	0	0	0	0	0	0	2	0
WEST NORTH CENTRAL												
Minnesota	53	40	66	0	1	0	1	0	0	0	0	0
Iowa	35	11	20	0	0	0	0	0	0	0	0	0
Missouri	13	9	23	0	0	0	0	0	0	0	0	0
North Dakota	6	15	15	0	0	0	0	0	0	0	0	0
South Dakota	5	9	6	0	0	0	0	0	0	0	0	0
Nebraska	13	3	3	0	0	0	0	0	0	0	0	0
Kansas	35	30	30	0	0	1	0	1	0	0	1	0
SOUTH ATLANTIC												
Delaware	4	7	7	0	0	0	0	0	0	0	0	0
Maryland [2]	34	81	37	0	0	0	13	1	0	0	0	0
District of Columbia	6	7	11	0	0	0	0	0	0	0	0	0
Virginia	101	44	44	0	0	0	46	0	0	1	1	6
West Virginia	16	12	22	0	0	0	0	0	0	0	0	0
North Carolina	184	63	103	0	0	0	0	0	0	0	2	4
South Carolina	51	30	37	0	0	0	0	0	0	0	0	5
Georgia	11	16	16	0	1	2	0	0	0	0	0	34
Florida	27	4	10	0	5	2	0	2	0	0	1	8
EAST SOUTH CENTRAL												
Kentucky	63	30	64	0	0	1	0	0	0	0	1	0
Tennessee	29	14	22	0	1	0	4	0	0	0	1	2
Alabama	0	28	19	0	0	0	0	0	0	0	0	25
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	2	8
WEST SOUTH CENTRAL												
Arkansas	13	30	21	0	3	2	0	0	0	0	1	0
Louisiana	2	3	6	0	1	2	0	0	0	0	0	11
Oklahoma	1	0	1	0	0	0	0	0	0	0	0	0
Texas	44	77	77	0	14	180	0	0	0	0	1	24
MOUNTAIN												
Montana	12	7	7	0	0	0	0	0	0	0	4	0
Idaho	8	1	1	0	0	0	0	0	0	0	0	0
Wyoming	10	17	2	0	0	0	0	0	0	0	0	0
Colorado	40	14	25	0	0	0	0	0	0	0	0	0
New Mexico	0	8	10	0	0	4	0	0	0	0	0	0
Arizona	11	2	8	0	0	0	16	0	0	0	0	0
Utah [2]	12	11	20	0	0	0	0	0	0	0	0	0
Nevada	2	1	------	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	63	13	50	0	0	0	0	0	0	0	0	0
Oregon	40	3	8	0	0	0	0	0	0	1	0	0
California	81	245	185	0	2	14	0	1	0	0	0	0
Total	2,379	2,804	3,291	2	29	255	82	5	0	2	17	128
44 weeks	159,207	152,581	152,581	58	1,808	14,237	3,746	597	24	429	699	3,716
44 weeks, 1942	------	------	------	71	1,025	11,006	5,999	500	42	449	750	3,114

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 3; Connecticut 1; Michigan, 1; Virginia, 6; Georgia, 2; Florida, 6; Texas, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 23, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	1	1	3	0	3	0	0	1
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	1	0	0	0
Massachusetts:												
Boston	0	0	------	0	0	9	10	3	23	0	1	20
Fall River	0	0	------	0	0	0	1	1	2	0	0	1
Springfield	0	0	------	0	0	0	3	0	9	0	0	5
Worcester	0	0	------	0	1	1	4	0	28	0	0	9
Rhode Island:												
Providence	0	0	------	0	18	3	1	2	1	0	1	29
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	1	3	0	0	0
Hartford	0	0	------	0	0	0	1	2	4	0	0	2
New Haven	0	0	------	0	0	0	0	0	3	0	0	0
MIDDLE ATLANTIC												
New York:												
Buffalo	1	0	------	1	1	1	2	6	3	0	1	2
New York	7	2	6	0	68	30	64	14	97	0	3	69
Rochester	0	0	------	0	0	2	7	0	6	0	0	12
Syracuse	0	0	------	0	0	2	3	0	1	0	0	13
New Jersey:												
Camden	0	0	------	1	0	0	1	0	2	0	0	0
Newark	0	0	1	0	3	1	5	2	8	0	1	21
Trenton	0	0	------	0	0	1	0	0	2	0	2	3
Pennsylvania:												
Philadelphia	2	0	2	1	7	6	25	0	21	0	1	39
Pittsburgh	0	0	2	1	20	3	17	0	14	0	0	5
Reading	0	0	------	0	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	0	19	1	4	0	27	0	0	2
Cleveland	0	0	------	0	1	1	10	2	39	0	2	20
Columbus	1	0	------	0	7	0	1	0	16	0	0	4
Indiana:												
Fort Wayne	1	0	------	0	1	0	0	0	1	0	0	0
Indianapolis	3	0	------	0	0	1	4	1	17	0	0	13
South Bend	0	0	------	0	9	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	1	0	3	0	0	0	0	0
Illinois:												
Chicago	1	0	2	1	3	5	20	26	36	0	0	49
Springfield	0	0	------	0	1	0	1	0	1	0	0	0
Michigan:												
Detroit	6	0	------	1	5	2	14	3	29	0	0	31
Flint	0	0	------	0	1	0	0	0	3	0	0	4
Grand Rapids	0	0	------	0	3	0	0	1	3	0	0	2
Wisconsin:												
Kenosha	0	0	------	0	2	1	0	0	3	0	0	0
Milwaukee	0	0	------	0	6	0	1	0	33	0	0	11
Racine	0	0	------	0	4	0	0	0	10	0	0	27
Superior	0	0	------	0	200	0	0	0	0	0	0	2
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	4	0	1	0	5	0	0	14
Minneapolis	6	0	------	0	12	1	2	5	15	0	0	0
St. Paul	3	0	------	0	16	1	8	0	6	0	0	16
Missouri:												
Kansas City	0	0	------	0	1	2	9	0	11	0	0	2
St. Joseph	0	0	------	0	0	0	0	0	4	0	0	0
St. Louis	1	0	2	0	1	2	12	0	8	0	0	9

City reports for week ended October 23, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	1	0	------	0	1	0	3	3	18	0	0	1
Kansas:												
Topeka	0	0	------	0	0	0	0	0	1	0	0	10
Wichita	0	0	------	0	0	0	1	0	5	0	0	2
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	0	1	0	0	1	0	0	0
Maryland:												
Baltimore	2	0	2	2	3	4	15	0	9	0	0	38
Cumberland	0	0	------	0	0	0	0	0	2	0	0	0
Frederick	0	0	------	0	0	0	1	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	1	4	12	0	15	0	0	2
Virginia:												
Lynchburg	1	0	------	0	42	0	0	0	0	0	0	18
Richmond	0	0	------	0	5	3	1	0	3	0	0	0
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	3	0	0	0	2	0	0	0
Wheeling	0	0	------	0	0	1	1	0	2	0	0	3
North Carolina:												
Winston-Salem	1	0	------	0	0	0	0	0	4	0	0	3
South Carolina:												
Charleston	1	0	5	0	0	0	1	0	1	0	0	0
Georgia:												
Atlanta	0	0	6	0	0	0	2	0	3	0	0	0
Brunswick	1	0	------	0	2	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	2	0	2	0	0	0
Florida:												
Tampa	0	0	------	0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	2	0	1	0	0	1	0	1	6
Nashville	0	0	------	0	0	0	2	0	4	0	0	7
Alabama:												
Birmingham	3	0	7	0	2	0	2	0	1	0	0	1
Mobile	0	0	------	0	0	0	3	0	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	0	0	0	0
Louisiana:												
New Orleans	1	0	------	0	0	1	7	2	3	0	1	0
Shreveport	0	0	------	0	0	0	6	0	0	0	0	0
Texas:												
Dallas	0	0	------	0	0	0	3	0	2	0	1	0
Galveston	0	0	------	0	0	0	1	0	0	0	0	0
Houston	2	1	------	0	2	0	7	1	1	0	1	1
San Antonio	2	0	------	0	1	0	2	0	0	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	1	0	0	0	0	0	0	0
Great Falls	0	0	------	0	19	0	0	0	2	0	0	0
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	1	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	1	0	0	0
Colorado:												
Denver	0	0	6	0	1	0	3	2	3	0	0	33
Pueblo	0	0	------	0	0	0	0	0	2	0	0	3
Utah:												
Salt Lake City	0	0	------	0	0	0	1	2	4	0	0	5
PACIFIC												
Washington:												
Seattle	4	0	------	0	2	0	5	6	3	0	0	34
Spokane	2	0	------	0	2	0	2	0	10	0	0	2
Tacoma	0	0	------	0	2	0	1	0	2	0	0	0

City reports for week ended October 23, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC—continued												
California:												
Los Angeles	15	0	3	0	5	2	2	11	10	0	2	11
Sacramento	1	1	------	0	1	0	2	1	2	0	0	0
San Francisco	0	0	------	0	0	1	5	13	0	0	0	8
Total	70	4	44	10	512	95	333	110	614	0	18	626
Corresponding week, 1942	89	2	76	22	273	28	326	31	569	2	27	1,012
Average, 1938–42	107	------	68	[1] 16	[2] 318	------	[1] 287	------	537	1	33	1,034

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: San Francisco, 1.
Dysentery, bacillary.—Cases: Buffalo, 14; New York, 10; Philadelphia, 1; Chicago, 2; Detroit, 6; St. Louis, 2; Baltimore, 6; Charleston, S. C., 17; Nashville, 4; Los Angeles, 6.
[illegible] Tampa, 1; Nashville, [illegible]

[1] 3-year average, 1940–42. [2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,648,700)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza Case rates	Influenza Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
New England	0.0	0.0	0.0	0.0	49.7	34.8	59.6	22.4	191.3	0.0	5.0	166
Middle Atlantic	4.5	0.9	4.9	1.8	44.6	20.5	55.3	9.8	68.7	0.0	3.6	73
East North Central	7.6	0.0	1.2	1.2	153.6	6.4	33.9	19.3	127.3	0.0	1.2	96
West North Central	21.8	0.0	4.0	0.0	69.2	11.9	71.2	15.8	134.5	0.0	0.0	107
South Atlantic	10.4	0.0	22.6	3.5	97.2	22.6	62.5	0.0	76.4	0.0	0.0	111
East South Central	17.8	0.0	41.6	11.9	11.9	5.9	41.6	0.0	41.6	0.0	5.9	83
West South Central	14.7	2.9	0.0	0.0	8.8	2.9	79.2	8.8	17.6	0.0	8.8	6
Mountain	0.0	0.0	48.2	0.0	168.8	0.0	32.2	32.2	104.5	0.0	0.0	330
Pacific	38.4	1.7	5.2	0.0	21.0	5.2	29.7	54.2	47.2	0.0	3.5	96
Total	10.5	0.6	6.6	1.5	77.1	14.3	50.1	16.6	92.4	0.0	2.7	94

PLAGUE INFECTION IN SISKIYOU COUNTY, CALIF.

Plague infection has been reported proved in pools of fleas from ground squirrels, *C. douglasii*, collected Sept. 27, 1943, in Siskiyou County, Calif., as follows: 66 fleas from 5 ground squirrels taken from a ranch 2½ miles north and 2 miles west of Yreka, and 58 fleas from 4 ground squirrels taken from the Montague Air Field, 3 miles east and 3 miles north of Montague.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—Up to October 31, 1943, a total of 849 cases of dengue fever has been reported in Honolulu, Hawaii Territory.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 9, 1943.—During the week ended October 9, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		7	1	51	101	12	16	12	42	242
Diphtheria		18	3	39		8	1		1	70
Dysentery (bacillary)				4						4
Encephalitis, infectious									1	1
German measles				1	5	1	1	7	10	25
Influenza		10	2		2	5			6	25
Measles		10	2	107	65	26	5	10	17	242
Meningitis, meningococcus		1		6	3		1			11
Mumps		10		11	42	15	9	6	26	119
Poliomyelitis				12	7	3	6	3		31
Scarlet fever		5	7	72	63	27	20	18	12	224
Tuberculosis (all forms)			9	118	61	10		3	22	223
Typhoid and paratyphoid fever				30	3				1	34
Undulant fever					4					4
Whooping cough		15		82	161	7	21	32	17	335

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Cochinchina.—Plague has been reported in Cochinchina, Indochina, as follows: September 1–10, 1943, 5 cases; September 11–20, 1943, 1 case; October 1–10, 1943, 1 case.

Peru.—For the month of September 1943, 1 case of plague with 1 death was reported in Libertad Department, and 2 cases of plague were reported in Lima Department, Peru.

Smallpox

Basutoland.—During the month of June 1943, 16 cases of smallpox were reported in Basutoland.

Indochina.—Smallpox has been reported in Indochina as follows: September 1–10, 1943, 94 cases; September 11–20, 1943, 108 cases; October 1–10, 1943, 73 cases.

Mauritania.—For the period September 11–20, 1943, 13 cases of smallpox were reported in Mauritania, and for the week ended October 9, 1943, 13 cases also were reported.

Niger Territory.—During the week ended October 9, 1943, 39 cases of smallpox were reported in Niger Territory.

Sudan (French).—During the week ended October 9, 1943, 46 cases of smallpox were reported in French Sudan.

Typhus Fever

Bulgaria.—For the period September 9–15, 1943, 4 cases of typhus fever were reported in Bulgaria.

Hungary.—Typhus fever has been reported in Hungary as follows: Week ended September 25, 1943, 10 cases; week ended October 2, 7 cases; week ended October 9, 12 cases.

Palestine.—During the week ended October 9, 1943, 15 cases of typhus fever were reported in Palestine.

Rumania.—Typhus fever has been reported in Rumania as follows: Week ended October 9, 1943, 30 cases; week ended October 16, 28 cases; week ended October 23, 37 cases.

Slovakia.—Typhus fever has been reported in Slovakia as follows: Week ended September 25, 1943, 11 cases; week ended October 2, 27 cases; week ended October 9, 27 cases.

Spain.—During the week ended August 14, 1943, 2 cases of typhus fever were reported in Spain, and for the period August 15–28, 12 cases were reported.

Union of South Africa.—During the month of June 1943, 292 cases of typhus fever were reported in the Union of South Africa.

Yellow Fever

Dahomey—Djougou District.—On September 3, 1943, 2 cases of yellow fever were reported in Djougou District, Dahomey.

COURT DECISION ON PUBLIC HEALTH

State sanitary code amendment defining milk products held invalid as applied to certain product.—(New York Court of Appeals; *Aerated Products Co. of Buffalo* v. *Godfrey, Com'r of Health,* 48 N. E. 2d 275; decided March 4, 1943.) The plaintiff, a New York corporation, was licensed by an Ohio corporation to manufacture and sell "Instant Whip." This product was made by a patented process and consisted of pasteurized cream, sugar, and vanilla. Nitrous oxide gas was introduced into this mixture, thus creating the quality of foaminess which characterizes whipped cream. The plaintiff held a license issued by the State Commissioner of Agriculture and Markets of New York authorizing it to purchase cream for purposes of manufacture only, and it conformed strictly with the sanitary regulations of such commissioner relating, with respect to "Instant Whip," to buildings where manufactured, persons having contact during manufacture, equipment used in manufacture, containers in which shipped, and premises and equipment where sold. In 1939 the State sanitary code was amended by adding to the definition of "milk products" the words "cream to which any substance has been added and for use in fluid state or whipped."

The plaintiff instituted an action for a declaratory judgment and the determination of the New York Court of Appeals was that the product in question was not a milk product as defined in the sanitary code and accordingly was not subject to regulation under the public health law. It was conceded that the sanitary code amendment was made to bring the plaintiff's product within the definition of a milk product and the appellate court said that that concession "when considered against the background of facts disclosed by material findings by the courts below, which we may not disregard, leads us to conclude that the amendment here in question as applied to the manufacture, sale and distribution of appellant's product 'Instant Whip,' is unreasonable, discriminatory and arbitrary and denies to the appellant the equal protection of the laws and due process of law guaranteed to it as constitutional rights."

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.
Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 NOVEMBER 19, 1943 NUMBER 47

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Public Health Reports

Vol. 58 • NOVEMBER 19, 1943 • *No. 47*

THE EFFECT OF TOPICALLY APPLIED SODIUM FLUORIDE ON DENTAL CARIES EXPERIENCE [1,2]

By JOHN W. KNUTSON, *Dental Surgeon, United States Public Health Service*, and WALLACE D. ARMSTRONG, *Professor of Physiological Chemistry, University of Minnesota*

INTRODUCTION

The results of numerous investigations into the relationship between fluorine and dental disease led to the hypothesis that the incidence of dental caries could be reduced by topical applications of a fluoride solution to the teeth. Since there is an extensive literature on the subject of fluorine and dental caries, only the five major links in the chain of evidence which engendered and supported this hypothesis will be enumerated here: First, Armstrong and Brekhus (*1*) demonstrated that intact enamel of carious teeth contains less fluorine than enamel of noncarious teeth. Second, the epidemiological studies of Dean and his collaborators (*2*, *3*, *4*, *5*) showed that the presence of approximately one part per million of fluoride in domestic water supplies is associated with a decreased prevalence of dental caries. Third, the results of animal experimentation demonstrated that the incidence of dental caries in the teeth of rats was reduced by the addition of extra fluorine to the diet (*6*, *7*, *8*, *9*). Fourth, Volker, Hodge, Wilson, and Van Voorhis (*10*) discovered that fluorine is absorbed from solution by powdered enamel in accordance with the requirements of the Freundlich adsorption isotherm. Fifth, the fluorine

[1] From Child Hygiene Studies, Division of Public Health Methods, National Institute of Health, Bethesda, Md., and the Laboratory of Dental Research and Division of Physiological Chemistry, University of Minnesota, Minneapolis, Minn.

[2] This study was made with the cooperation and assistance of the Minnesota Department of Health through Dr. V. D. Irwin, director, Division of Dental Health. For this cooperation, for the use of dental equipment, and for the assistance of Cecelia Maday, dental health advisor, in administering the dental prophylaxis and fluoride treatments, the grateful appreciation of the authors is expressed.

Appreciation is likewise expressed to Ione Jackson, assistant professor, Course for Dental Hygienists, University of Minnesota Dental School, for providing student personnel to assist in giving dental prophylaxis to the children in the study groups.

Thanks are extended to Messrs. H. P. Dubke, H. E. Anderson, and N. H. McKay, superintendents of schools at North Mankato, Arlington, and St. Louis Park, respectively, for their cooperation during the initiation and progress of this study, and to Professor P. J. Brekhus, University of Minnesota Dental School, Dr. H. A. Garmers, and Mr. A. J. Ziegler, Minneapolis, for their loans of special dental equipment.

The Graduate School of the University of Minnesota and the Council on Dental Therapeutics of the American Dental Association furnished grants which were used to defray part of the expenses of this investigation.

content of the enamel of mature erupted rat molars is increased by giving drinking water containing 20 p. p. m. of fluoride and apparently the increase is brought about by direct adsorption (*11*).

Two preliminary reports made in 1942 presented the results of investigations into the effect of topical applications of fluoride to the teeth. Bibby (*12*) reported that during the year following the institution of treatment, 95 new carious surfaces occurred in the permanent teeth of the treated quadrants and 135 new carious surfaces occurred in the permanent teeth of the untreated mouth quadrants of 89 children aged 10 to 13 years. Treatment consisted of topical applications of a 0.1 percent solution of sodium fluoride to the teeth at intervals of 4 months. In reporting on a 3- to 3.5-month period of caries experience in the deciduous teeth of 27 treated children and 19 control children aged 4½ to 6 years, Cheyne (*13*) concluded that the treatment effected a 50-percent reduction in caries incidence and had a pronounced tendency to arrest lesions which were actively carious at the time of treatment. Treatment consisted of two complete applications of a 0.05 percent potassium fluoride solution to the teeth of the treated group. Recently Bibby (*14*) reported that the order of differences noted in the first preliminary report on his study group had decreased slightly 2 years after treatment was initiated. Although these pieces of direct evidence are not conclusive, they are in accord with the original hypothesis.

It is the purpose of this paper to present data on the incidence of dental caries during the year ended May 1943, in the permanent teeth of two groups of children. The first of these, a treated group consisting of 289 children, received topical applications of 2-percent sodium fluoride solution to the teeth in the upper left and lower left quadrants of the mouth. The second, a control group consisting of 326 children, did not receive the fluoride treatments. Briefly, the analysis of the data indicates:

1. In the treated group there were 39.8 percent less new carious teeth in the treated than in untreated teeth.
2. The difference between the caries incidence in the treated and untreated teeth was appreciably greater in the upper than in the lower teeth.
3. The number of new carious surfaces in teeth previously attacked by caries was not significantly different in the treated and untreated teeth.
4. The incidence of caries in the teeth of the right or untreated mouth quadrants of the treated group was not significantly different from that in the teeth of the right (or the left) quadrants of the control group.

MATERIAL AND METHODS

In March 1942, parental permission was obtained in three small urban centers in Minnesota to make topical application of fluoride to the teeth of 337 children aged 7 to 15 years. Of this group of children, 126 attended the public grade school in North Mankato,

114 attended either the public or parochial school in Arlington, and 97 attended junior high school in St. Louis Park.

Prior to the institution of treatment, each child in the treated group received a dental prophylaxis treatment consisting of scaling and polishing of the teeth and a detailed dental examination. The examinations were made with mouth mirror and explorer under artificial light and with compressed air available for use at the examiner's discretion. Only the teeth in the upper left and lower left quadrants of the mouth were treated. The treatment consisted of isolation of the teeth with cotton rolls, drying the teeth with compressed air, and wetting the crown surfaces of the teeth with 2-percent sodium fluoride solution. The applied solution was allowed to dry in air for approximately 4 minutes. After the cotton rolls had been removed, the child was instructed to expectorate and he was then dismissed.

During an 8-week period in April and May 1942, the North Mankato and Arlington children in the treated group were given two treatments weekly to a maximum of 15 and a minimum of 8 treatments. The St. Louis Park children were given one treatment weekly to a maximum of 8 and a minimum of 7 treatments. The number of treatments given each child was determined largely on the basis of the maximum number of treatments that could be administered conveniently during the 8-week period remaining in the school year. This study was not designed to determine the minimum number of effective treatments but to assess the worth of relatively frequent exposures of the teeth to soluble fluorides administered over a relatively short period of time.

Children enrolled in the same schools as the treated group but not participating in the treatment program were utilized as a control group. The 392 children in this group were given dental prophylaxis treatment and dental examination similar to that given the children in the treated group.

Approximately 1 year after the fluoride treatments had been administered, the teeth of the children in both the treated and control groups were reexamined. The second examinations were made by the same person and with the same equipment as the first. Of the 337 children originally in the treated group, 289 were reexamined; of the 392 children originally in the control group, 326 were reexamined. Thus 14.2 percent of the treated group and 16.8 percent of the control group were not reexamined. Most of the children not available for the second examination had changed residence or were not attending school at the time the reexaminations were conducted. A few were absent from school.

Only the data pertaining to the children who were given a second examination are presented here. The analysis is confined to the

dental caries experience in the erupted permanent teeth present at the time of the first examinations. The term *new caries* is used in this presentation to designate teeth or tooth surfaces which were non-carious in April 1942 and became carious (decayed or filled) during the year ended May 1943. A total of 14 teeth, 6 from the left and 8 from the right mouth quadrants, were extracted from children in the treated group during the study year. Since the new caries experience in these teeth prior to extraction is not known, they are omitted from the tabulations. The age classification refers to the age at the time of the first examination.

FINDINGS

Results obtained from a comparison of the incidence of new carious teeth in the treated and untreated mouth quadrants of each child in the treated group are summarized in table 1. Because of the bilaterally equal occurrence of dental caries in the teeth of population groups, it is reasonable to expect that the number of instances in which individuals have more caries in the left than in the right quadrants of the jaw would be equal to the number of instances in which the opposite obtains. From an inspection of the data in table 1, it will be noted that for the upper quadrants 63 children had fewer new carious teeth in the treated than in the untreated quadrant, whereas the relationship was in the reverse order in only 26 children. For the lower jaw, 48 children had fewer and 30 children had more new carious teeth in the treated than untreated quadrant.

TABLE 1.—*The incidence of caries in permanent teeth previously free of caries. A comparison of fluorine-treated and untreated quadrants in each jaw of 289 treated children*

	Upper jaw	Lower jaw
	Persons	*Persons*
Lower incidence in treated quadrant	63	48
Higher incidence in treated quadrant	26	30
Incidence equal (one or more) in treated and untreated quadrant	15	12
No new carious teeth in either treated or untreated quadrant	185	199
Total number of children	289	289

A complete test of the statistical significance of the difference between the observed distribution of caries experience by mouth quadrants as given in table 1 and a theoretical distribution based on bilaterally equal occurrence of dental caries is possible provided the detailed data on dental caries in the individual teeth of each quadrant are available. However, a conservative estimate can be obtained readily by limiting the comparison to the instances in which there were less new carious teeth in the treated than in the untreated quadrants and the instances in which the reverse result was observed. On the

assumption that these two events should occur with equal frequency, the probability that the observed difference would occur by chance is 0.0001 for the upper quadrants and 0.0417 for the lower quadrants.

The number of permanent teeth without evidence of past or present caries at the time of the first examination in 1942, and the number of these that were attacked by caries during the year ended May 1943, are presented for the treated group in table 2. In addition, the number of carious tooth surfaces in newly attacked teeth and the number of new carious surfaces in previously attacked teeth are also given.

It will be noted from the totals for all ages in table 2 that 54 teeth became carious in the upper left or treated quadrant and 100 in the upper right or untreated quadrant. This represents a difference of 46.0 percent less new carious teeth in the treated than in the untreated upper teeth. On the basis of percentage of teeth attacked, the rate is 5.3 for the treated and 9.7 for the untreated teeth. The probability that this or a greater difference might occur by chance is 0.0002.

In the lower jaw, 46 new carious teeth occurred in the left and 66 in the right quadrant. This is a difference of 30.3 percent less carious teeth in the treated than in the untreated teeth. The percentage of teeth attacked is 3.7 for the treated and 5.3 for the untreated lower teeth. The probability that this or a greater difference might occur by chance is 0.0574. Although this difference is not statistically significant, the fact that in eight of the nine age groups fewer teeth became carious in the treated than in the untreated quadrant and the fact that the difference is in accord with the findings in the upper teeth strongly suggest that the observed difference is real but that the available experience is insufficient to be conclusive.

The total number of new carious teeth in both treated quadrants is 100 and that for both untreated quadrants is 166. This is a gross difference of 39.8 percent less teeth attacked by caries in the treated than in the untreated teeth. In terms of percentage caries attack rates for the previously noncarious teeth, 4.4 percent of the treated and 7.3 percent of the untreated became carious during the study year.

Since the number of tooth surfaces attacked by caries is highly correlated with the number of teeth attacked, it is to be expected that the difference in the number of new carious tooth surfaces occurring in the teeth of the treated and untreated quadrants of the mouth would be similar to the differences indicated in terms of numbers of teeth attacked. The direction of the difference is the same—112 and 166 new carious tooth surfaces in the treated and untreated upper quadrants, respectively, and 120 and 147 in the treated and untreated lower quadrants, respectively. In the upper quadrants, there were 32.5 percent less and in the lower quadrants there were 18.4 percent

TABLE 2.—*Treated group, dental caries experience during the year ended May 1943, for the permanent teeth in the treated and untreated quadrants of the jaws of 289 Minnesota children*

			Treated					Untreated					Treated					Untreated				
			Upper left					Upper right					Lower left					Lower right				
Age	Urban center	Number of children	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]
7	North Mankato	10	15	0	0	0	0	16	0	0	0	0	21	1	1	3	4	21	2	2	2	4
8	North Mankato	18	30	4	4	1	5	35	5	5	1	6	37	1	1	2	3	40	2	3	0	3
9	North Mankato	26	73	4	5	3	8	80	9	9	3	12	84	2	3	5	8	83	4	4	3	7
10	North Mankato	22	52	4	4	4	8	62	10	11	6	17	80	1	1	5	6	77	4	6	4	10
10	Arlington	19	54	2	2	1	3	51	3	3	0	3	66	3	4	4	8	71	2	3	3	6
10	Total	41	106	6	6	5	11	113	13	14	6	20	146	4	5	9	14	148	6	9	7	16
11	North Mankato	21	75	3	3	3	6	77	4	4	3	7	89	3	4	1	5	94	4	5	8	13
11	Arlington	18	63	4	4	0	4	63	4	4	4	8	85	4	6	4	10	83	4	4	6	10
11	Total	39	138	7	7	3	10	140	8	8	7	15	174	7	10	5	15	177	8	9	14	23
12	North Mankato	9	41	1	1	0	1	41	2	2	2	4	46	0	0	0	0	48	1	1	1	2
12	Arlington	26	116	5	7	8	15	112	13	16	2	18	127	3	4	6	10	131	15	15	6	21
12	St. Louis Park	16	60	3	3	2	5	57	2	2	3	5	80	4	4	4	8	70	2	3	4	7
12	Total	51	217	9	11	10	21	210	17	20	7	27	253	7	8	10	18	249	18	19	11	30
13	Arlington	15	78	2	4	6	10	82	10	10	3	13	81	3	3	5	8	78	3	3	6	9
13	St. Louis Park	29	120	8	8	4	12	124	17	20	5	25	150	10	11	8	19	158	12	14	10	24
13	Total	44	198	10	12	10	22	206	27	30	8	38	231	13	14	13	27	236	15	17	16	33
14	Arlington	19	81	6	7	8	15	81	8	8	4	12	98	3	3	0	3	95	5	6	4	10
14	St. Louis Park	31	114	6	8	7	15	105	11	12	18	30	142	6	8	16	24	149	6	6	10	16
14	Total	50	195	12	15	15	30	186	19	20	22	42	240	9	11	16	27	244	11	12	14	26

15	Arlington	3	16	1	2	0	2	15	0	0	1	1	16	1	1	0	1	16	0	0	2	2
15	St. Louis Park	7	22	1	1	2	3	25	2	3	2	5	34	1	2	1	3	32	0	0	3	3
15	Total	10	38	2	3	2	5	40	2	3	3	6	50	2	3	1	4	48	0	0	5	5
	Total all ages	289	1,010	54	63	49	112	1,026	100	109	57	166	1,236	46	56	64	120	1,246	66	75	72	147

1 Number of noncarious teeth present at the time of the first examination, April 1942.
2 Number of noncarious teeth that became carious during the year ended May 1943.
3 Number of surfaces attacked by caries in new carious teeth.
4 Number of new carious surfaces in teeth that had one or more carious surfaces at the time of the first examination.
5 The sum of the items in 3 and 4.

less new carious tooth surfaces in the treated than in the untreated teeth. For all teeth, the gross difference between the number of new carious tooth surfaces in treated and untreated teeth is 25.9 percent. However, the order of this difference is appreciably less than when the comparison was made on the basis of teeth instead of tooth surfaces. An explanation for this finding can be obtained from a comparison of the number of new carious tooth surfaces in previously attacked teeth. It will be noted that although the totals are less for the treated than the untreated—49 in the treated and 57 in the untreated upper teeth, and 64 in the treated and 72 in the untreated lower teeth—the differences are relatively slight. Furthermore, when the comparison is made for each age group, it will be found that the number of instances in which the new carious tooth surfaces are fewer in the treated than in the untreated previously attacked teeth is markedly similar to the number of instances in which the opposite result is obtained. The conclusion follows that either the treatment is not effective in preventing caries attack on surfaces of previously attacked teeth or the order of its effectiveness is not great enough to be determined from these data.

The foregoing analysis of findings in the treated groups has been made without differentiation according to number of treatments given. The distribution of the children with respect to the number of treatments received is presented in table 3.

TABLE 3.—*Number of children in the treated group according to number of topical applications of sodium fluoride solution to the teeth in the left quadrants of the mouth, and according to school attended*

School	Number of treatments									
	7	8	9	10	11	12	13	14	15	Total
North Mankato					1	1	4	15	85	106
Arlington		1				4	12	13	70	100
St. Louis Park	5	78								83
All schools	5	79			1	5	16	28	155	289

Since all but 51 of the North Mankato and Arlington children received the maximum number of 15 treatments and all but 5 of the St. Louis Park children received the maximum number of 8 treatments, a comparison of the findings within these two groups with respect to number of treatments is not indicated. However, a comparison of the caries experience in the St. Louis Park children with that in the North Mankato and Arlington children is warranted. An examination of the data on the age specific caries experience presented in table 2 gives no indication that the North Mankato and Arlington children who received roughly twice as many treatments as the St. Louis Park children were benefited by the additional treatments.

During administration of the treatment, complete wetting of the crown surfaces of the central incisors was not obtained in most instances without wetting the mesial surface of the central incisors in the untreated quadrants. The effect of this partial wetting is not known. However, 9 central incisors in the treated quadrants and 13 in the untreated quadrants were attacked by caries. Since the difference in caries experience in the left and right central incisors was similar to that for all teeth in the treated and untreated quadrants, the general results of the analysis would not be influenced by removing these teeth from consideration.

It is not unlikely that topical applications of fluoride to the teeth in two quadrants of the mouth might have a general effect on the environment and caries experience of the teeth in the untreated quadrants. In order to measure this effect, a negative control group of children was studied concurrently with the treated group. The only means of determining the comparability of the expected new caries experience in these two groups of children for the year ended May 1943 is to ascertain the similarity or dissimilarity in their past caries experience. Data on the prevalence of dental caries in the treated and control groups of children at the time of the first examinations are presented in table 4.

TABLE 4.—*The number, and the average number of decayed, missing, or filled (DMF) permanent teeth per child for 289 treated children and 326 control children, by age, April 1942*

	Age								
	7	8	9	10	11	12	13	14	15
	Number of DMF teeth								
Treated group	18	42	75	178	232	340	309	517	104
Control group	14	22	47	81	86	300	459	784	487
	Average number of DMF teeth per child								
Treated group	1.80	2.33	2.88	4.34	5.95	6.67	7.02	10.34	10.40
Control group	1.08	2.20	2.76	4.50	5.73	6.98	7.06	8.34	9.55

The age specific prevalence of dental caries in the treated group and that in the control group (table 4) are quite similar. The numerical average of the nine age specific rates for the treated and for the control group are 5.75 and 5.36, respectively. Because of this similarity, it seems reasonable to expect that for the year following the first examination the incidence of dental caries in the treated group would normally be approximately the same as that in the control group.

Data on the incidence of dental caries in the control group are presented in table 5. From the totals for all ages, it will be noted

TABLE 5.—*Control group. Dental caries experience during year ended May 1943, in the permanent teeth of 326 Minnesota children*

Age	Urban center	Number of children	Upper left					Upper right					Lower left					Lower right				
			P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]	P teeth[1]	New DF teeth[2]	DF surfaces in new DF teeth[3]	New DF surfaces in DF teeth[4]	Total new DF surfaces[5]
7	North Mankato	13	23	5	5	0	5	21	2	2	0	2	25	1	2	1	3	27	1	1	2	3
8	North Mankato	10	22	0	0	1	1	21	1	1	2	3	26	1	1	1	2	24	1	1	2	3
9	North Mankato	7	19	3	3	2	5	16	1	1	0	1	21	0	0	0	0	19	1	1	0	1
9	Arlington	10	24	1	1	2	3	22	0	0	1	1	26	1	1	0	1	30	1	2	3	5
9	Total	17	43	4	4	4	8	38	1	1	1	2	47	1	1	0	1	49	2	3	3	6
10	North Mankato	6	16	1	1	2	3	20	2	2	1	3	29	1	1	0	1	24	2	3	2	5
10	Arlington	12	36	11	13	3	16	34	10	11	4	15	34	2	2	1	3	35	1	1	7	8
10	Total	18	52	12	14	5	19	54	12	13	5	18	63	3	3	1	4	59	3	4	9	13
11	North Mankato	11	27	0	0	6	6	30	3	3	2	5	46	0	0	1	1	49	1	2	4	6
11	Arlington	4	20	1	1	0	1	19	0	0	0	0	20	0	0	1	1	19	1	1	1	2
11	Total	15	47	1	1	6	7	49	3	3	2	5	66	0	0	2	2	68	2	3	5	8
12	North Mankato	5	24	2	2	0	2	24	1	1	0	1	22	0	0	3	3	24	2	3	2	5
12	Arlington	5	26	0	0	3	3	25	3	3	0	3	27	1	2	1	3	28	3	3	3	6
12	St. Louis Park	33	155	18	21	6	27	153	16	18	3	21	177	10	11	8	19	175	9	11	7	18
12	Total	43	205	20	23	9	32	202	20	22	3	25	226	11	13	12	25	227	14	17	12	29
13	Arlington	6	34	3	4	3	7	33	5	6	1	7	35	4	5	1	6	33	0	0	4	4
13	St. Louis Park	59	263	30	34	30	64	265	38	45	21	66	293	18	23	26	49	296	16	17	25	42
13	Total	65	297	33	38	33	71	298	43	51	22	73	328	22	28	27	55	329	16	17	29	46
14	Arlington	12	57	3	4	1	5	59	5	7	6	13	67	1	1	3	4	64	4	5	4	9
14	St. Louis Park	82	364	31	38	33	71	364	35	39	46	85	404	22	25	28	53	420	28	34	24	58
14	Total	94	421	34	42	34	76	423	40	46	52	98	471	23	26	31	57	484	32	39	28	67

15	Arlington	20	91	10	10	5	15	86	4	3	5	8	98	4	5	9	14	96	6	7	4	11
15	St. Louis Park	31	131	9	11	17	28	128	12	16	22	38	146	7	10	5	15	146	5	8	17	25
15	Total	51	222	19	21	22	43	214	16	19	27	46	244	11	15	14	29	242	11	15	21	36
	Total all ages	326	1,332	128	148	114	262	1,320	138	158	114	272	1,496	73	89	89	178	1,509	82	100	111	211

[1] Number of noncarious teeth present at the time of the first examination, April 1942.
[2] Number of noncarious teeth that became carious during the year ended May 1943.
[3] Number of surfaces attacked by caries in new carious teeth.
[4] Number of new carious surfaces in teeth that had one or more carious surfaces at the time of the first examination.
[5] The sum of the items in [3] and [4].

that in the upper jaw there are 10 more new carious teeth in the right than in the left quadrant, and in the lower jaw there are 9 more in the right than in the left quadrant. The left quadrants had 8.6 percent less new carious teeth than the right quadrants. This digression from bilateral symmetry in the occurrence of dental caries suggests the possibility of a slight systematic error. However, the difference is not statistically significant. Furthermore, a comparison of the number of new carious teeth in the upper left quadrant with the number in the upper right quadrant, for each of the nine age groups, results in the finding that 4 are less, 3 are greater, and 2 are equal. When similar comparison is made between the findings in the lower left and lower right quadrants, the results are 4 less, 1 greater, and 4 equal. This ordering of the differences by age indicates that the differences observed in the totals were due to chance.

In order to facilitate a direct comparison of the new caries experience in the treated and control groups, a part of the data given in tables 2 and 4 is rearranged and presented in table 6, together with age specific percentage attack rates.

TABLE 6.—*Number and percentage of previously noncarious permanent teeth attacked by caries during the year ended May 1943, by age, and left and right mouth quadrants, for the treated and control children*

Age	Treated group						Control group					
	Left quadrants			Right quadrants			Left quadrants			Right quadrants		
	P teeth [1]	New DF teeth [2]	Percent DF [3]	P teeth [1]	New DF teeth [2]	Percent DF [3]	P teeth [1]	New DF teeth [2]	Percent DF [3]	P teeth [1]	New DF teeth [2]	Percent DF [3]
7	36	1	2.8	37	2	5.4	48	6	12.5	48	3	6.2
8	67	5	7.5	75	7	9.3	48	1	2.1	45	2	4.4
9	157	6	3.8	163	13	8.0	90	5	5.6	87	3	3.4
10	252	10	4.0	261	19	7.3	115	15	13.0	113	15	13.3
11	312	14	4.5	317	16	5.0	113	1	.9	117	5	4.3
12	469	16	3.4	459	35	7.6	431	31	7.2	429	34	7.9
13	429	23	5.4	442	42	9.5	625	55	8.8	627	59	9.4
14	435	21	4.8	430	30	7.0	892	57	6.4	907	72	7.9
15	88	4	4.5	88	2	2.3	466	30	6.4	456	27	5.9
Total	2,245	100	4.4	2,272	166	7.3	2,828	201	7.1	2,829	220	7.8
Average rate [4]			4.5			6.8			7.0			7.0

[1] Noncarious (without caries or fillings) at time of first examination, April 1942.
[2] Noncarious teeth [1] attacked by caries during the year ended May 1943.
[3] Percent of noncarious teeth [1] attacked by caries during year ended May 1, 1943.
[4] Numerical average of the nine age specific rates.

This arrangement of the data (table 6) makes available another type of comparison between the new caries experience in the treated and untreated mouth quadrants of the treated group. However, the specific purpose in presenting this arrangement is to afford direct comparisons between the caries experience in the right or untreated quadrant of the treated group and that in the same quadrants of the control group. Since the age distribution of the children in the treated and control groups is dissimilar, an additional summary figure

is presented, the average rate. This figure is merely the numerical average of the age specific rates, and thus gives equal weight to each of the nine age specific rates.

It will be noted (table 6) that the average rate for the percentage of teeth attacked by caries is 6.8 for the right or untreated quadrants of the treated group and 7.0 for the right quadrants of the control group. Further evidence of marked similarity in the new caries experience in the right quadrants of the treated and untreated groups is obtained from comparison of the age specific percentage attack rates. Although there is considerable variation in these age specific rates, the differences are equally divided, 4 being higher and 5 being lower in the treated than in the control group. Inasmuch as dental caries normally occurs in bilaterally equal distribution, it is not necessary to limit the comparision to the right quadrant of the control group. The result obtained when the average rate for the right quadrants of the treated group is compared with the average rate for the left quadrant of the control group is again 6.8 and 7.0.

The striking similarity in the new caries experience in the right or untreated mouth quadrants of the treated group and that in the right (or left) quadrants in the control group indicates that the effect of topical applications of fluoride is exclusively local during the first year after application. This is evidence that the teeth in the treated and the teeth in the untreated mouth quadrants of the treated group actually retain the intended relationship of experimental and control for the period of experience presented in this report.

DISCUSSION

The results of this analysis demonstrate that topical application of a 2-percent sodium fluoride solution to the teeth under the conditions of this investigation was effective in reducing the incidence of dental caries by roughly 40 percent. However, the evidence applies only to that effect produced during the first year following the applications and to a group of children with an average incidence of approximately one DMF permanent tooth per year. The duration of the effect is not yet known.

Apparently the treatment is not effective in preventing caries attack on the noncarious surfaces of teeth previously attacked. If this finding is substantiated by continued studies, it has important implications which may assist in determining the physical or chemical action of fluorides on enamel. Further, it would indicate that the effectiveness of the treatment is largely limited to the prevention of caries and that it is not effective in controlling active dental caries. Therefore, the validity of this finding will also be an important factor in establishing the procedures to be employed in conducting a program of topical applications of fluoride to the teeth.

Since the criterion for diagnosing arrested caries is highly subjective, in the judgment of the examiner there was no evidence that the treatment effected an arrest of the active caries. However, this opinion is in accord with the findings on new carious surfaces in teeth previously attacked by caries. The question of whether or not the treatment arrests active caries is important to the interpretation of these findings. If arrest is effected, then these findings probably represent the true difference in caries experience in the treated and untreated teeth. On the other hand, if arrest is not effected, then these findings represent a conservative estimate of the difference. This is true because undoubtedly some of the new caries in the treated teeth was initiated prior to treatment but was not detected during the first examination.

As stated previously, it was not the intent of this study to determine the minimum number of treatments necessary to obtain the full effectiveness of the fluorides. However, the findings do indicate that 15 treatments were not more effective than 8 treatments. It is possible that one thorough treatment would be fully as effective as multiple treatments, but the answer to this question remains to be determined by future studies.

Although a 2-percent solution of sodium fluoride was used in this study, the most effective concentration of this solution or of other fluorides is not known. A 2-percent solution of sodium fluoride is highly toxic and must be used and guarded with extreme caution. Certainly the optimum concentration of the fluoride solution would be the minimum effective concentration.

SUMMARY

Data on the incidence of dental caries in the permanent teeth of 289 treated children and 326 control children for the year ended May 1943 have been presented and analyzed. During the first 8-week period of the observation the children in the treated group received 7 to 15 topical applications of sodium fluoride solution to the teeth in the left quadrants of the mouth.

Analysis of the data indicate that during the year of these observations:

1. Approximately 40 percent less new carious teeth occurred in the treated than in the untreated teeth of the treated group of children.
2. The relative reduction in the incidence of dental caries in treated teeth was appreciably greater in the upper than in the lower teeth.
3. There was no significant difference between the number of new carious tooth surfaces in treated and untreated teeth which had been previously attacked by caries. This finding indicates that the treatment was not effective in inhibiting renewed attacks by caries on teeth already attacked.

4. The incidence of dental caries in teeth in the untreated mouth quadrants of the treated group was similar to that in teeth in the comparable mouth quadrants of the control group. This finding indicates that for the first year following treatment the caries inhibiting effect is local and limited to those teeth to which the fluoride is topically applied.

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THE IDENTIFICATION OF FIRST STAGE LARVAE OF PUERTO RICAN *ANOPHELES*

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The keys to *Anopheles* larvae are based primarily on characters most prominent in fourth stage larvae. Since many of these, such as a well developed palmate hair, are not present in first stage larvae,

other characters must be used to distinguish them. A study of material reared from eggs and collected in the field has shown that good characters do exist to distinguish first instar larvae from later instar larvae and also for separating first stage larvae of the three Puerto

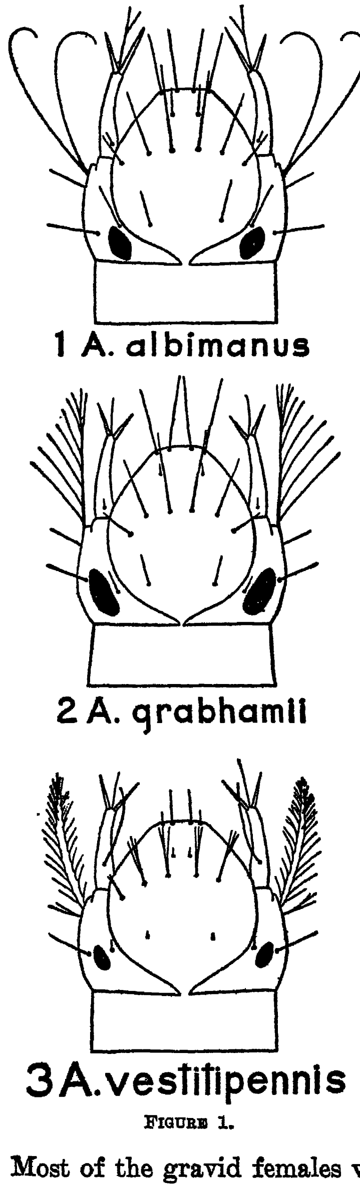

FIGURE 1.

Rican *Anopheles*. Most of the gravid females which laid eggs were collected within 5 miles of San Juan, P. R.

Martini (*4*), Hurlbut (*1*, *2*), and Marshall (*3*) have shown that the first stage anopheline larvae can be distinguished from later instar

larvae by a number of characters. Among those discussed by these writers, the following have been found to be reliable for Puerto Rican species.

First instar larva	*Later instar larva*
2 strong lateral hairs on third abdominal segment.	1 strong lateral hair on third abdominal segment.
Single, spindle-shaped, or "lanceolate" hair on abdominal segments 3 to 7.	Palmate hair composed of leaflets on abdominal segments 3 to 7.
No ventral brush on anal segment.	Ventral brush on anal segment.
Comb and pecten present and separate on terminal abdominal segments.	Comb absent; pecten connected to respiratory apparatus.

Considerable variation exists in the spacing and branching of the head hairs in first stage larvae. The most constant characters for separating the first stage larvae of the three Puerto Rican species of *Anopheles* are given in the following key:

1. Subantennal hair simply forked, two-branched from the base; antennal hair short, never reaching to tip of antennal shaft; frontal head hairs single
Anopheles (*Nyssorhynchus*) *albimanus* Wiedemann.
Subantennal hair pinnately branched on one or both sides of a central shaft -- 2
2. Subantennal hair with branches on only one side of a slender central shaft; antennal hair short, never reaching to tip of antennal shaft; frontal head hairs single
Anopheles (*Anopheles*) *grabhamii* Theobald.
Subantennal hair with branches on both sides of a stout central shaft; antennal hair long, reaching to or beyond tip of antennal shaft; frontal head hairs 2- to 6-branched
Anopheles (*Anopheles*) *vestitipennis* Dyar and Knab.

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COURT DECISION ON PUBLIC HEALTH

Garbage — dumping — construction of statute concerning. — (Texas Court of Civil Appeals; *Bright et al.* v. *City of Corpus Christi et al.*, 172 S.W.2d 763; decided June 9, 1943.) A suit was instituted by a number of citizens against the city of Corpus Christi and a construction company to enjoin the construction of a garbage disposal plant on a site adjoining, and in close proximity to, the residences and properties of the plaintiffs. At the close of the plaintiffs' case the trial court instructed a verdict in favor of the defendants and entered judgment accordingly. On appeal to the Court of Civil Appeals of Texas one of the contentions of the plaintiffs was that the instructed verdict was improper because the operation of the garbage disposal plant would necessarily involve the dumping of garbage within 300 yards of a public highway, an act which was prohibited by the State penal code. The disposal plant's site was within 300 yards of a public highway and the garbage, when brought to the plant, was to be dumped into a vat, picked up by a grab basket, elevated to the third floor, and cast into the incinerator and destroyed by fire. The view of the appellate court was that it was not the legislature's intention to prohibit the dumping of garbage at a disposal plant but that it was the intention to prevent the dumping or placing of trash, refuse, debris, garbage, and carcasses of dead animals near public roads and highways with no provision for destroying same. "The legislature never intended to prevent the dumping of garbage into a vat at an incinerator for immediate destruction."

The judgment of the lower court was affirmed.

DEATHS DURING WEEK ENDED NOVEMBER 6, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 6, 1943	Corresponding week, 1942
Data for 89 large cities of the United States:		
Total deaths	8,611	8,395
Average for 3 prior years	8,192	
Total deaths, first 44 weeks of year	396,734	368,055
Deaths under 1 year of age	609	611
Average for 3 prior years	571	
Deaths under 1 year of age, first 44 weeks of year	28,445	25,428
Data from industrial insurance companies:		
Policies in force	66,017,204	65,224,094
Number of death claims	10,477	9,525
Death claims per 1,000 policies in force, annual rate	8.3	7.6
Death claims per 1,000 policies, first 44 weeks of year, annual rate	9.7	9.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 13, 1943

Summary

An increase was recorded for the week in the incidence of meningococcus meningitis. A total of 223 cases was reported, as compared with 193 for the preceding week and a 5-year (1938–42) median of 33. A total of 15,796 cases has been reported to date this year, as compared with 3,039 for the same period last year and a corresponding 5-year median of 1,768. Cases reported since the beginning of the fourth quarter of the current year, the approximate date of the lowest incidence, aggregate 1,269, as compared with 368 for the same period last year and a corresponding 5-year median of 205.

States reporting more than 6 cases currently are as follows (last week's figures in parentheses): *Increases*—New Jersey 14 (8), Pennsylvania 21 (14), Ohio 12 (9), Michigan 17 (5), Missouri 11 (1), Virginia 11 (4), and California 11 (7); *decreases*—New York 33 (42), and Illinois 8 (14).

For the country as a whole, a decrease in the incidence of poliomyelitis was recorded. A total of 243 cases was reported, as compared with 259 for the preceding week and a 5-year median of 178. The total number of cases reported to date this year is 11,622, as compared with 3,733 for the same period last year and a 5-year median of 6,630. States reporting 10 or more cases currently (last week's figures in parentheses) are as follows: Massachusetts 10 (8), New York 17 (16), Indiana 26 (23), Kansas 11 (8), Oklahoma 14 (12), Oregon 19 (18), and California 62 (59).

Current reports of other important communicable diseases are as follows (figures for the corresponding week last year in parentheses): Anthrax 2 (0), diphtheria 398 (551), dysentery (all forms) 593 (283), infectious encephalitis 13 (12), influenza 1,555 (1,596), leprosy 1 (0), measles 3,688 (2,003), Rocky Mountain spotted fever 1 (1), scarlet fever 2,609 (2,518), smallpox 8 (9), tularemia 2 (10), typhoid and paratyphoid fever 80 (98), typhus fever 104 (87), and whooping cough 2,367 (2,998).

Deaths recorded in 90 large cities of the United States for the week totaled 8,540, as compared with 8,670 for the preceding week and a 3-year (1940–42) average of 8,377. The cumulative total for the year to date is 407,248, as compared with 378,437 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended November 13, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42
	Nov. 13, 1943	Nov. 14, 1942		Nov. 13, 1943	Nov. 14, 1942		Nov. 13, 1943	Nov. 14, 1942		Nov. 13, 1943	Nov. 14, 1942	
NEW ENGLAND												
Maine	0	1	1	------	5	3	57	2	21	0	4	0
New Hampshire	0	0	0	------	1	------	12	43	1	1	0	0
Vermont	0	0	0	------	------	------	0	98	3	0	0	0
Massachusetts	6	2	2	------	------	------	166	220	115	6	1	1
Rhode Island	0	4	0	------	1	------	54	1	1	4	2	0
Connecticut	0	0	0	1	9	3	3	63	23	5	4	0
MIDDLE ATLANTIC												
New York	16	24	15	[1] 3	[1] 12	[1] 7	240	127	137	33	17	4
New Jersey	4	3	5	2	22	4	188	26	18	14	2	2
Pennsylvania	1	15	15	2	3	------	169	207	207	21	8	2
EAST NORTH CENTRAL												
Ohio	7	24	24	4	5	5	495	27	27	12	0	0
Indiana	7	6	18	45	6	6	106	29	7	3	1	1
Illinois	11	24	25	9	9	9	36	27	27	8	2	0
Michigan [2]	5	8	11	87	1	1	352	93	93	17	2	1
Wisconsin	6	1	1	18	29	29	404	56	60	1	0	0
WEST NORTH CENTRAL												
Minnesota	10	20	1	------	1	1	420	5	31	2	0	0
Iowa	3	3	6	------	2	1	3	43	20	0	0	0
Missouri	6	4	10	3	2	2	3	5	8	11	0	0
North Dakota	4	1	3	------	14	4	210	1	6	0	0	0
South Dakota	3	1	2	------	------	1	11	8	4	0	1	0
Nebraska	4	4	2	5	5	------	5	49	2	0	0	0
Kansas	2	5	2	------	------	5	3	9	9	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	17	0	1	3	0	0
Maryland [2]	7	11	11	------	1	3	23	9	9	5	4	0
District of Columbia	0	0	2	2	2	2	11	3	1	2	0	0
Virginia	11	28	36	107	308	114	208	7	7	11	3	2
West Virginia	6	14	14	------	17	12	16	2	8	2	0	1
North Carolina	21	59	89	2	1	1	42	1	53	6	0	0
South Carolina	12	40	23	305	293	229	52	2	9	4	3	0
Georgia	26	24	32	19	14	36	23	4	5	3	0	0
Florida	12	5	5	11	1	1	5	1	4	4	0	0
EAST SOUTH CENTRAL												
Kentucky	9	10	18	3	3	4	13	4	12	6	0	1
Tennessee	13	18	18	15	22	25	12	29	8	5	4	2
Alabama	26	28	28	52	27	49	23	2	8	1	1	1
Mississippi [3]	5	10	16	------	------	------	------	------	------	3	0	1
WEST SOUTH CENTRAL												
Arkansas	6	15	15	26	35	35	4	12	5	0	0	0
Louisiana	7	12	12	11	3	3	1	1	1	1	1	1
Oklahoma	5	10	12	38	65	35	12	1	1	4	0	0
Texas	62	56	57	630	523	220	27	21	29	5	3	1
MOUNTAIN												
Montana	2	0	0	1	1	8	78	4	8	0	0	0
Idaho	2	0	0	------	------	------	5	12	5	1	0	0
Wyoming	0	1	1	2	39	------	7	7	3	0	0	0
Colorado	17	16	16	15	37	28	52	3	13	2	0	0
New Mexico	0	1	2	------	1	1	0	0	5	0	0	0
Arizona	3	2	2	116	22	55	1	2	5	1	0	0
Utah [3]	0	2	1	------	1	3	1	264	23	0	0	0
Nevada	0	0	0	3	1	------	4	3	0	0	0	0
PACIFIC												
Washington	23	3	1	------	1	1	45	312	21	4	2	0
Oregon	2	1	4	6	7	7	34	117	11	1	0	0
California	26	35	23	12	44	28	35	41	111	11	4	1
Total	398	551	641	1,555	1,596	1,115	3,688	2,003	1,792	223	69	33
45 weeks	11,513	12,959	13,301	94,209	92,868	159,002	557,876	478,155	478,155	15,796	3,039	1,768

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 13, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42	Week ended—		Median, 1938–42
	Nov. 13, 1943	Nov. 14, 1942		Nov. 13, 1943	Nov. 14, 1942		Nov. 13, 1943	Nov. 14, 1942		Nov. 13, 1943	Nov. 14, 1942	
NEW ENGLAND												
Maine	0	1	1	15	8	8	0	0	0	0	1	1
New Hampshire	0	1	0	1	15	9	0	0	0	0	0	0
Vermont	0	0	0	14	9	5	0	0	0	1	0	0
Massachusetts	10	0	1	142	197	95	0	0	0	1	1	1
Rhode Island	2	0	0	8	21	7	0	0	0	1	1	0
Connecticut	1	1	0	23	44	22	0	0	0	1	0	0
MIDDLE ATLANTIC												
New York	17	7	7	239	224	173	0	0	0	7	7	7
New Jersey	1	9	5	62	71	65	0	0	0	1	1	1
Pennsylvania	1	0	6	153	152	152	0	0	0	5	5	9
EAST NORTH CENTRAL												
Ohio	2	4	5	223	181	205	0	0	0	2	6	6
Indiana	1	5	2	53	57	104	1	0	1	0	0	3
Illinois	26	11	11	107	170	213	1	1	1	3	3	6
Michigan [2]	4	2	6	105	63	140	1	0	1	2	3	2
Wisconsin	7	2	5	116	183	116	2	1	2	0	0	0
WEST NORTH CENTRAL												
Minnesota	1	2	8	64	54	63	0	0	0	0	4	0
Iowa	1	2	2	54	41	50	0	0	1	4	2	1
Missouri	3	1	1	48	55	55	0	0	0	2	2	4
North Dakota	5	0	0	8	13	13	0	0	0	0	0	0
South Dakota	0	3	3	12	18	28	0	0	0	0	1	1
Nebraska	3	7	0	32	15	11	0	0	1	0	0	0
Kansas	11	1	1	94	37	71	2	0	0	0	1	3
SOUTH ATLANTIC												
Delaware	0	0	0	2	19	6	0	0	0	0	0	0
Maryland [2]	0	0	0	40	53	35	0	0	0	0	11	4
District of Columbia	0	0	0	15	19	13	0	0	0	1	0	0
Virginia	2	0	1	54	85	65	0	0	0	1	2	5
West Virginia	1	1	1	84	35	62	0	0	0	1	1	3
North Carolina	0	0	1	130	116	112	0	1	0	3	2	2
South Carolina	0	0	0	10	20	20	0	0	0	2	4	3
Georgia	1	1	1	31	42	82	0	0	0	1	4	3
Florida	0	2	1	12	10	4	0	0	0	0	8	2
EAST SOUTH CENTRAL												
Kentucky	6	1	5	44	57	72	0	1	0	3	6	7
Tennessee	0	0	0	55	97	92	0	0	0	3	6	6
Alabama	0	3	1	22	36	34	0	0	0	2	1	2
Mississippi [2]	2	0	2	4	21	12	0	0	0	1	0	2
WEST SOUTH CENTRAL												
Arkansas	3	2	1	8	13	11	0	1	1	8	1	7
Louisiana	0	0	0	14	10	11	0	0	1	4	6	6
Oklahoma	14	0	1	58	23	17	0	0	1	1	0	3
Texas	9	12	4	55	47	47	0	1	1	9	4	16
MOUNTAIN												
Montana	2	0	0	34	11	26	0	0	0	2	0	0
Idaho	0	0	2	11	1	11	0	0	0	1	0	1
Wyoming	0	0	0	1	6	6	0	0	0	0	0	0
Colorado	6	2	0	27	33	33	0	0	0	3	1	2
New Mexico	2	0	0	15	7	6	0	0	0	0	3	3
Arizona	0	4	0	10	1	1	0	0	0	1	1	1
Utah [2]	7	3	3	28	11	12	0	0	0	0	1	1
Nevada	3	1	0	3	1	0	0	0	0	0	0	0
PACIFIC												
Washington	8	1	1	58	35	35	1	3	1	0	0	3
Oregon	19	0	0	59	22	15	0	0	0	0	1	1
California	62	17	5	152	109	89	0	0	0	3	2	3
Total	243	109	178	2,609	2,518	2,518	8	9	18	80	93	154
45 weeks	11,622	3,733	6,630	118,943	107,925	135,823	663	698	2,132	4,990	6,209	8,735

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 13, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended Nov. 13, 1943								
	Week ended—		Median, 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Nov. 13, 1943	Nov. 14, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	6	62	44	0	0	0	0	0	0	0	0	0
New Hampshire	3	3	1	0	0	0	0	0	0	0	0	0
Vermont	34	42	42	0	0	0	0	0	0	0	0	0
Massachusetts	41	207	172	0	0	4	0	0	0	0	0	0
Rhode Island	22	29	21	0	0	0	0	0	0	0	0	0
Connecticut	37	70	72	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	257	470	459	0	3	147	0	3	0	0	0	0
New Jersey	96	244	161	0	3	0	0	1	0	0	0	0
Pennsylvania	145	326	279	2	0	0	0	1	0	0	0	1
EAST NORTH CENTRAL												
Ohio	153	124	191	0	0	1	0	1	0	0	0	0
Indiana	11	22	13	0	0	0	0	0	0	0	2	0
Illinois	122	152	161	0	1	4	0	1	0	0	0	0
Michigan [3]	180	232	232	0	0	1	0	0	0	0	0	0
Wisconsin	191	143	195	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	54	40	45	0	1	0	0	0	0	0	0	0
Iowa	24	18	22	0	0	0	0	0	0	0	0	0
Missouri	12	5	11	0	0	0	0	0	0	0	0	0
North Dakota	20	7	7	0	0	0	0	0	0	0	0	0
South Dakota	27	0	6	0	0	0	0	0	0	0	0	0
Nebraska	8	11	7	0	0	0	0	1	0	0	0	0
Kansas	15	17	22	0	1	1	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	1	1	5	0	0	0	0	0	0	0	0	0
Maryland [2]	51	87	52	0	0	0	4	0	0	0	0	0
Dis. of Col.	15	12	12	0	1	0	0	0	0	0	0	0
Virginia	80	50	50	0	0	0	133	0	0	0	0	0
West Virginia	16	7	23	0	0	0	0	0	0	0	0	0
North Carolina	190	41	113	0	0	0	0	0	0	0	0	4
South Carolina	47	20	20	0	0	14	0	0	0	0	0	2
Georgia	5	19	9	0	0	3	0	0	0	0	0	27
Florida	0	16	10	0	10	1	0	1	0	0	0	7
EAST SOUTH CENTRAL												
Kentucky	88	19	59	0	0	0	0	0	0	0	0	0
Tennessee	11	27	27	0	0	0	1	0	0	0	0	2
Alabama	17	9	9	0	0	0	0	0	0	0	0	18
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	5
WEST SOUTH CENTRAL												
Arkansas	13	44	16	0	1	12	0	0	0	0	0	1
Louisiana	6	4	6	0	5	6	0	0	0	0	0	13
Oklahoma	0	4	4	0	0	0	0	0	0	0	0	0
Texas	81	85	85	0	15	185	0	0	0	0	0	23
MOUNTAIN												
Montana	0	11	11	0	0	0	0	0	0	0	0	0
Idaho	5	0	4	0	0	0	0	0	0	0	0	0
Wyoming	2	3	4	0	0	0	0	0	0	0	0	0
Colorado	36	5	17	0	0	0	0	0	0	0	0	0
New Mexico	4	8	8	0	0	5	1	0	0	0	0	0
Arizona	18	9	9	0	1	0	15	2	0	0	0	0
Utah [2]	26	7	27	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	83	21	31	0	0	0	0	0	0	0	0	0
Oregon	18	8	12	0	0	0	0	0	0	1	0	0
California	96	257	142	0	6	7	0	2	1	0	0	1
Total	2,367	2,998	3,242	2	48	391	154	13	1	1	2	104
45 weeks	161,574	155,529	155,529	60	1,356	14,628	3,900	610	25	430	701	3,820
45 weeks, 1942	------	------	------	71	1,042	11,194	6,077	512	42	450	760	3,201

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 1; New York, 1; Michigan, 1; Georgia, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 30, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	2	1	2	0	8	0	0	3
New Hampshire:												
Concord	0	0	------	1	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	3	0	------	1	4	5	10	4	25	0	0	18
Fall River	0	0	------	0	1	0	0	0	0	0	0	4
Springfield	0	0	------	0	3	0	0	0	1	0	0	17
Worcester	0	0	------	0	0	3	4	0	18	0	1	9
Rhode Island:												
Providence	0	0	------	0	24	3	0	3	0	0	0	13
Connecticut:												
Bridgeport	0	0	1	1	0	1	2	1	4	0	0	0
Hartford	0	0	------	0	0	0	0	1	1	0	0	1
New Haven	0	0	------	0	0	0	1	0	3	0	0	6
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	3	5	5	0	3	0	0	14
New York	5	1	5	2	108	18	69	15	86	0	4	62
Rochester	0	0	------	0	2	2	8	1	5	0	0	12
Syracuse	0	0	------	0	0	1	1	2	1	0	0	19
New Jersey:												
Camden	1	0	------	1	0	0	2	0	2	0	0	1
Newark	0	0	------	0	2	2	2	1	7	0	0	11
Trenton	0	0	------	0	0	0	3	1	1	0	0	1
Pennsylvania:												
Philadelphia	2	0	1	1	3	7	25	2	32	0	0	35
Pittsburgh	6	0	3	1	45	5	18	0	19	0	0	16
Reading	0	0	------	0	0	1	0	0	2	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	4	0	------	0	23	0	1	1	22	0	0	7
Cleveland	1	0	6	1	4	0	7	0	41	0	0	11
Columbus	0	0	------	0	10	1	0	0	18	0	0	6
Indiana:												
Indianapolis	2	0	------	0	1	0	11	0	14	0	0	10
South Bend	0	0	------	0	2	0	0	0	2	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	4	0	------	0	4	6	21	20	26	0	1	66
Springfield	0	0	------	0	2	0	1	0	7	0	0	0
Michigan:												
Detroit	4	0	------	2	5	6	14	1	34	0	1	29
Flint	0	0	------	0	2	0	0	0	0	0	0	4
Grand Rapids	0	0	------	0	0	0	2	0	6	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	3	0	0	0
Milwaukee	0	0	------	0	2	2	6	0	26	0	0	51
Racine	0	0	------	0	3	0	0	0	5	0	0	12
Superior	0	0	----	0	131	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	5	0	3	0	4	0	0	17
Minneapolis	6	0	------	0	45	0	1	4	18	0	0	4
St. Paul	1	0	------	0	28	1	3	2	7	0	0	24
Missouri:												
Kansas City	1	0	------	0	3	1	5	0	7	0	0	2
St. Joseph	0	0	------	0	0	1	0	0	1	0	0	0
St. Louis	0	0	6	0	1	2	9	0	5	0	0	8

City reports for week ended October 30, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	6	0	0	0	4	0	0	4
Nebraska:												
Omaha	5	0	------	0	0	0	4	0	5	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	0	0	1	0	0	2
Wichita	0	0	------	0	0	1	3	0	0	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	1	0	3	2	1	0	1	0	1	0
Maryland:												
Baltimore	3	0	2	2	2	6	15	0	10	0	0	23
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	5	7	6	2	18	0	0	10
Virginia:												
Lynchburg	0	0	------	0	64	0	1	0	1	0	0	25
Richmond	0	0	1	0	3	4	2	1	3	0	0	0
Roanoke	0	0	------	0	0	0	0	0	0	0	0	1
West Virginia:												
Charleston	0	0	------	0	1	0	0	0	2	0	0	0
Wheeling	0	0	------	0	0	0	1	0	0	0	0	0
North Carolina:												
Winston-Salem	2	0	------	0	0	0	0	0	4	0	0	0
South Carolina:												
Charleston	0	0	28	0	3	1	1	0	1	0	0	0
Georgia:												
Atlanta	1	0	4	1	1	1	4	0	7	0	0	0
Brunswick	0	0	------	0	7	0	0	0	1	0	0	0
Savannah	0	0	------	0	0	0	2	0	1	0	0	0
Florida:												
Tampa	0	0	------	0	0	0	2	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	------	0	0	1	1	0	2	0	1	2
Nashville	0	0	------	0	0	0	3	0	1	0	0	6
Alabama:												
Birmingham	0	0	4	0	2	0	3	0	2	0	0	0
Mobile	0	0	2	0	0	0	2	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	0	0	0	0
Louisiana:												
New Orleans	2	0	2	1	1	3	8	0	5	0	0	0
Shreveport	0	0	------	0	0	0	2	0	0	0	1	0
Texas:												
Dallas	0	0	------	0	0	0	2	1	3	0	0	2
Galveston	1	0	------	0	0	0	0	0	0	0	0	0
Houston	2	0	------	0	0	1	5	1	0	0	2	0
San Antonio	1	0	------	1	0	0	5	2	1	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	7	0	0	0	11	0	0	5
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	5	0	6	0	2	3	8	0	4	0	0	27
Pueblo	0	0	------	0	4	0	0	1	1	0	0	1
Utah:												
Salt Lake City	0	0	------	0	1	0	1	7			0	3

City reports for week ended October 30, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	0	0		3	5	0	3	2	4	0	0	19
Spokane	0	0		0	8	0	0	2	9	0	0	0
Tacoma	1	0		0	1	0	1	4	3	0	0	8
California:												
Los Angeles	4	0	3	0	8	0	7	7	15	0	0	6
Sacramento	0	1		0	0	0	1	2	1	0	0	5
San Francisco	1	0	1	1	4	1	10	8	11	0	0	7
Total	69	2	76	20	606	105	343	99	596	0	12	645
Corresponding week, 1942	121	3	85	26	377	85	345	36	624	1	34	997
Average, 1938–42	109		74	[1] 17	[2] 369		[1] 301		587	1	30	1,069

[1] 3-year average, 1940–42.
[2] 5-year median.

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: Boston, 3; Philadelphia, 1; St. Louis, 1; Los Angeles, 1.
Dysentery, bacillary.—Cases: Buffalo, 19; New York, 9; Syracuse, 1; Philadelphia, 2; Chicago, 1; St. Louis, 1; Charleston, S. C., 2; Atlanta, 1; Nashville, 2; Los Angeles, 8.
Dysentery, unspecified.—Cases: Richmond, 1; San Antonio, 2.
Tularemia.—Cases: New Orleans, 1.
Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 1; Brunswick, 1; Savannah, 3; Birmingham, 2; New Orleans, 3; Shreveport, 1; Houston, 2.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,554,700)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza Case rates	Influenza Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
New England	7.5	0.0	2.5	7.5	84.5	32.3	49.7	22.4	149.1	0.0	2.5	176
Middle Atlantic	6.2	0.4	4.0	2.2	72.7	18.3	59.3	9.8	70.5	0.0	1.8	77
East North Central	8.9	0.0	3.6	1.8	111.9	8.9	37.3	13.0	117.9	0.0	1.2	116
West North Central	25.4	0.0	11.7	0.0	172.0	11.7	54.7	11.7	101.6	0.0	0.0	119
South Atlantic	10.4	0.0	62.5	5.2	154.4	36.4	60.7	5.2	85.0	0.0	1.7	102
East South Central	5.9	0.0	35.6	0.0	11.9	5.9	53.5	0.0	29.7	0.0	5.9	48
West South Central	17.6	0.0	5.9	5.9	2.9	11.7	67.5	11.7	26.4	0.0	8.8	6
Mountain	40.2	0.0	48.2	0.0	112.6	24.1	80.4	64.3	168.8	0.0	0.0	289
Pacific	10.5	1.7	7.0	7.0	45.4	1.7	38.4	43.7	75.2	0.0	0.0	70
Total	10.4	0.3	11.5	3.0	91.4	15.8	51.8	14.9	89.9	0.0	1.8	97

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—According to information received, a total of 927 cases of dengue fever has been reported up to November 8, 1943, in Honolulu, T. H.

Plague (rodent).—A rat found on October 13, 1943, in Makawao area, Island of Maui, T. H., has been proved positive for plague.

Panama Canal Zone

Notifiable diseases—September 1943.—During the month of September 1943 certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	4		2		6		7		19	
Diphtheria	13		6		1		2		22	
Dysentery (amebic)	1		1		1		8		11	
Dysentery (bacillary)	1						3	1	4	1
Leprosy	1								1	
Malaria [1]	9		4		123		49	6	[1] 185	6
Measles			1		2				3	
Mumps	20		31		93		6		150	
Paratyphoid fever	1						1		2	
Pneumonia		12		1	21			1	[2] 21	14
Relapsing fever					1		1		2	
Tuberculosis		18		5	4	2		8	[2] 4	33
Typhoid fever							2	1	2	1
Whooping cough		1								1

[1] 52 recurrent cases.
[2] Reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 16, 1943.—During the week ended October 16, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		4	1	129	135	26	21	15	94	425
Diphtheria		10	12	60		1		1		84
Dysentery (bacillary)				2			1		5	8
German measles		1		10	9				2	22
Influenza					30	2			40	72
Measles		4	1	134	101	18	5	3	51	317
Meningitis, meningococcus				2	4	2	1		2	11
Mumps		3		39	99	21	7	7	28	204
Poliomyelitis		1	1	3	2	1		2		10
Scarlet fever		1	12	118	74	26	21	21	42	315
Tuberculosis (all forms)		12	5	85	45	17	26		31	221
Typhoid and paratyphoid fever		1		11	2	1			1	16
Undulant fever					2					2
Whooping cough		10		112	153	17		31	13	336

JAMAICA

Notifiable diseases—4 weeks ended October 23, 1943.—During the 4 weeks ended October 23, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox		9	Leprosy		3
Diphtheria	3	2	Tuberculosis	34	88
Dysentery		4	Typhoid fever	4	66
Erysipelas	1	1	Typhus fever	3	1

NORWAY

Trondheim—Diphtheria.—According to information dated November 3, 1943, an epidemic of diphtheria is spreading in Trondheim, Norway, where it is said that 105 new cases were reported in October 1943.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Belgian Congo—Butakonda Lubero.—During the period October 15–19, 1943, 7 deaths from suspected pneumonic plague were reported at Butakonda Lubero, Belgian Congo. All necessary protective measures including strict quarantine of the affected region have been taken.

Morocco (French).—During the month of September 1943, 2 cases of plague were reported in Casablanca region and 1 case was reported in Marrakech region, French Morocco.

Smallpox

Algeria.—For the period September 21–30, 1943, 29 cases of smallpox were reported in Algeria.

Morocco (French).—During the month of September 1943, 34 cases of smallpox were reported in French Morocco.

Typhus Fever

Algeria.—For the period September 21–30, 1943, 14 cases of typhus fever were reported in Algeria.

Hungary.—During the week ended October 16, 1943, 21 cases of typhus fever were reported in Hungary.

Morocco (French).—During the month of September 1943, 63 cases of typhus fever were reported in French Morocco.

Rumania.—For the period October 24–31, 1943, 46 cases of typhus fever were reported in Rumania (including 2 cases in Bucharest).

Slovakia.—For the week ended October 16, 1943, 6 cases of typhus fever were reported in Slovakia.

Tunisia.—Typhus fever has been reported in Tunisia as follows: July 21–31, 1943, 64 cases; for the month of August 1943, 92 cases; for the month of September 1943, 26 cases.

Yellow Fever

French Guinea.—Deaths from suspected yellow fever have been reported in French Guinea as follows: October 29, 1943, 1 death at Baccoro; October 30, 1943, 1 death at Conakry.

Senegal—Tambacounda.—On October 28, 1943, 1 death from yellow fever was reported at Tambacounda, Senegal.

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UNITED STATES PUBLIC HEALTH SERVICE

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UNITED STATES GOVERNMENT PRINTING OFFICE WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Public Health Reports

Vol. 58 • **NOVEMBER 26, 1943** • *No. 48*

THE PROMIN TREATMENT OF LEPROSY. A PROGRESS REPORT

By G. H. FAGET, *Senior Surgeon*, R. C. POGGE, *Assistant Surgeon (R)*, F. A. JOHANSEN, *Surgeon (R)*, J. F. DINAN, *Passed Assistant Surgeon (R)*, B. M. PREJEAN, *Passed Assistant Dental Surgeon (R)*, and C. G. ECCLES, *Passed Assistant Surgeon (R)*, *United States Marine Hospital (National Leprosarium), Carville, La.*

Promin, the sodium salt of p. p. diaminodiphenylsulfone n. n. didextrose sulfonate, has been used in experimental tuberculosis in guinea pigs with remarkable success (*1*). Its clinical trial in human tuberculosis as a chemotherapeutic agent has met with at least promising results (*2*). Its experimental use in the treatment of leprosy was commenced by the writers over 2 years ago, and at present it is felt that promin is a therapeutic agent worthy of further trial in human leprosy. The writers have had no experience with the drug in murine leprosy, but in this type of the disease the reports are suggestive of slight action (*3*).

In our experience promin is the best of all the sulfonamide derivatives, including sulfanilamide, sulfathiazole, sulfapyridine, and sulfadiazine, which have been used in the treatment of leprosy at the National Leprosarium (*4*). It can be regarded as the most encouraging experimental treatment ever undertaken at the National Leprosarium. The writers are not in a position at this time to state that it possesses any specific action upon Hansen's bacillus. They consider it an advance in the right direction in the chemotherapy of leprosy and hope that further synthesis of the sulfa chemicals will produce a product which has specific properties against M. leprae and M. tuberculosis.

Our experimental study was made possible through the cooperation of Parke Davis & Co., the manufacturers of promin, which was generously supplied gratis for this experiment through Dr. E. A. Sharp, the director of the Department of Clinical Investigation of this firm.

TECHNIQUE

Promin can be given orally or intravenously. By oral administration it is more toxic, and much larger doses are tolerated by the intravenous route. In our preliminary studies promin was given by mouth to a group of 10 patients. Small doses of ½ to 1 gm. were

tolerated for such short periods that therapeutic effects seemed unlikely by this method of administration. Severe reactions, particularly hemolysis, were so easily provoked that this mode of medication was soon abandoned. Since then the intravenous injection has been favored in all cases. The great majority of patients under treatment have received from 1 to 5 gm. daily for 6 days a week, Sunday excepted. Most of the patients were given the 5-gm. dose, and the course of treatment was continuous for months with only short intervals of rest of 1 to 2 weeks three times a year. In the case reports, in calculating the average daily dose, these rest periods and Sundays are included.

Studies of the promin concentration in the blood showed a rapid decline. It was found that only traces remained 6 to 8 hours following the intravenous administration of 5 gm. of promin.

TOXIC MANIFESTATIONS

The intravenous administration of promin is not free from toxic reactions. The most important of these is a slow destruction of the erythrocytes. This effect is generally delayed for several weeks, but one must be constantly on the alert for its development. It is our practice to do complete blood counts routinely every 2 weeks on every patient on this treatment.

In the writers' experience, anemia occurs in 46 percent of cases after 6 weeks of intravenous promin therapy. The longer the continuous course of treatment, the greater the number of anemic patients. It was observed that during the complete course of treatment the erythrocytes fell to 3.5 million or less in 71 percent of cases and in 9 percent they fell below 3 million. In the great majority of these cases antianemic therapy, with or without cessations of promin, was successful in raising the red blood cells and hemoglobin to their former levels.

Satisfactory maintenance of blood levels can be attained in several ways. A fall of the red blood cells below 4 million is an indication to start the patient on inorganic iron, ferrous sulfate, or ferrous carbonate, in adequate doses. This usually restores the red blood cell count and hemoglobin level, as occurred in 66 percent of our cases. If the erythrocytes continue to decrease, an oral liver and iron preparation is substituted for the iron. This proved adequate in readjusting the erythrocytes and hemoglobin in 60 percent of cases not responding to iron alone. A certain percentage of patients do not respond to these simple measures. In such instances and whenever the red blood cells decline below 3 million, promin is discontinued temporarily and liver extract is administered parenterally in addition to iron orally. This treatment is continued until the erythrocytes

rise above 3.5 million, when it is considered safe to resume promin therapy at the rate of 2 gm. a day, provided the liver and iron are continued.

According to Higgins (*5*) promin in guinea pigs exerts a direct toxic effect on the erythrocytes, leading to their destruction and removal from the blood by the spleen. He found that promin did not permanently damage the bone marrow and regeneration of erythrocytes proceeded during continuous administration of the drug.

The writers have observed that in some cases the institution of promin therapy actually resulted in an increase in the red blood cell count and the hemoglobin percentage. It is believed that in such cases the healing of secondary infections results in a general improvement in the patient's health, one of the manifestations of which is the lessening of secondary anemia.

Besides a decrease in the red blood cells, leucopenia has been encountered. It occurred in 3 percent of the cases under treatment. Severe agranulocytosis did not develop, but it was thought best to discontinue promin promptly whenever the white blood cells fell below 3,000. In one case promin treatment was abandoned because the response to injections of pentnucleotide and liver extract was unsatisfactory.

A routine bimonthly urinalysis is another precautionary measure instituted in this experimental study, since other sulfonamides are known to cause renal impairment. So far, no evidence of kidney irritation or damage has been demonstrated by the routine urinalyses, which are supplemented by occasional renal function tests whenever deemed indicated. Toomey and Tokacs (*6*) were not successful in attempts to produce urinary concretion in monkeys by intravenous injections of promin doses six times as large as those recommended for human beings.

After hemolysis, the most important toxic reaction was the development of an allergic dermatitis. This generally manifested itself as a diffuse maculopapular eruption which was accompanied by intense itching. Dermatitis medicamentosa is, of course, a cause for temporarily discontinuing promin therapy. In the majority of these allergic patients, desensitization is feasible. After the eruption has completely disappeared, promin is resumed in minute doses, 0.1 gm., intravenously. By gradually increasing the dose over a period of approximately one month, it is possible to arrive at therapeutic doses of 2 gm. daily without further allergic reactions. In some cases full doses of 5 gm. are eventually reached without a recurrence of dermatitis.

Allergic dermatitis occurred in 16 percent of the patients under study. Two-thirds of these have been desensitized at present. In

only 3 percent of cases the procedure proved entirely unsuccessful; the others are in the process of desensitization.

Another manifestation is allergic rhinitis, which developed in one patient. After several months the sneezing episodes following each injection of promin ceased.

Other untoward reactions, headaches and nausea, are generally mild and ephemeral. Nausea occurred in 35 percent of cases. It is transitory in nature and can be prevented by injecting the drug more slowly. Vomiting followed nausea in only 7 percent of cases. It also responds to slower injection, up to 1 minute being required to administer 5 gm. of promin intravenously. Several patients complained of headaches, which were never severe.

An increase in erythema of leprous plaques was noted in 3 percent of the cases. This accompanied the first few weeks of treatment and gradually subsided. Its cause is unknown. Acute leprae reactions with fever and the appearance of erythema nodosum occurs less frequently with promin than with most previous experimental treatments or than with the routine chaulmoogra oil injections. It was the cause of discontinuing promin therapy in only four cases.

An exacerbation of an iridocyclitis occurred in 10 percent of cases. In all of them the patient had experienced frequent previous attacks of iridocyclitis. This drug seems temporarily to increase the severity of the ocular inflammation, which is generally followed by improvement. In only one patient the exacerbation of iridocyclitis initiated by promin persisted longer than 1 month.

A generalized lymphadenitis was another unusual toxic manifestation which occurred in one patient. Reduction of the dose of promin to 1 gm. resulted in the subsidence of the glandular enlargement.

CLINICAL MATERIAL

No attempt was made to select minimal or moderately advanced cases with favorable prognosis. Thus only a few cases of neural and maculoanesthetic types are included in the study. All patients treated were bacterioscopically positive at onset and many had never had a negative bacteriologic report during the entire previous period of hospitalization. Many patients volunteering for treatment had far advanced lepromatous and mixed types of leprosy with poor prognosis. The disease in the majority of cases was showing a definite trend toward aggravation before the institution of promin therapy. Several cases were selected because of certain complications which it was thought might be favorably influenced by the promin. Among these important complications were: Leprous keratitis and iridocyclitis, with pending loss of vision in some cases; leprous rhinitis with ulcerations, repeated epistaxis and partial obstruction of nares;

leprous laryngitis with threatening suffocation; chronic leprous ulcerations; and lepromatous lesions and ulcers of the tongue, palate, gums, and lips, which usually respond poorly to other forms of treatment. The effects of promin in these complications of leprosy have, for the most part, been good.

Patients with eye, nose, and throat complications were examined before and during the course of treatment in the eye, ear, nose, and throat clinic, and those with oral lesions were examined in like manner in the dental clinic.

The eye, ear, nose, and throat specialist (J. F. D.) reports that many patients under promin therapy showed a marked improvement in nasal breathing. The initial examination in these patients reveals ulcerations of the nasal mucous membrane and excessive mucous secretion, which on drying and crusting produces blockage of the nasal passages. There is also a tendency to frequent epistaxis. After a course of promin it is observed that the ulcerations, which are probably due to secondary infection, heal, the excessive secretion and crust formation subside, and nasal bleeding ceases.

Another observation is that promin seems to benefit eye complications of leprosy. It is noted that patients on promin therapy do not have so many attacks of acute iridocyclitis as formerly. Two patients have shown by slit lamp examination that leprous punctate keratitis has disappeared to a considerable extent.

Objective improvement in vision has been marked in only one patient. This patient started with only light perception and projection in one eye, the other being totally blind. Shortly after the institution of promin parenterally, the acute iridocyclitis and edema of the cornea gradually improved. This continued until on the last examination it was found that he had recovered 20/100 vision in his good eye.

Many patients with advanced lepromatous and mixed leprosy show evidence of leprous laryngitis. The symptoms are huskiness of voice, vocal weakness, dryness of the throat with unproductive cough, and finally attacks of respiratory difficulty. Six patients with advanced leprous laryngitis were started on promin intravenously, and all of them improved, especially in the quality of their voices and the restoration of comfortable respiration. It is felt that two of these patients escaped a proposed emergency tracheotomy because of the beneficial relief attributable to promin therapy.

In the dental clinic it was noted that in several patients leprous lesions of lips, tongue, gums, and hard and soft palate have diminished and in four patients completely disappeared after prolonged treatment with promin. Some mucosal ulcerations of the hard and soft palate and of the lips have healed under the influence of promin.

CASE REPORTS

A brief summary of the progress of patients having taken at least 12 months of promin treatment is given in the following case reports:

Case 869.—White male, 28 years of age, is a moderately advanced lepromatous (nodular) case of 12 years' duration. There was little previous improvement during 9 years of hospitalization. A total of 2,030 gm. of promin was given intravenously during 26 months. The average daily dose, including rest periods, was 2.6 gm. After 6 months of treatment there was a gradual disappearance of discrete nodules of face and torso. At present the patient appears entirely free of leprous lesions. The monthly skin smears became bacteriologically negative after 2 years of treatment. An occasional acid-fast bacillus was found in one subsequent skin smear. Photographic confirmation of improvement is evident.

Case 864.—A 36-year-old white male with far-advanced lepromatous (nodular) leprosy of 12 years' duration had shown no recent advance in the disease prior to promin therapy. He was given 1,375 gm. intravenously during a period of 26 months. The daily dose averaged 1.7 gm. including rest periods. These rest periods and hematopoietic drugs were necessary to combat toxic hemolytic anemia. The erythrocytes varied from 3.02 to 4.67 million during the course of treatment. It was observed that facial nodules definitely retrogressed in size and prominence. This improvement started gradually after about a year's treatment and has been progressive. A troublesome nasal obstruction secondary to leprous rhinitis has apparently completely cleared up. General improvement is shown in the patient's ability to play baseball this season for the first time in 3 years.

Case 714.—A white male, 23 years of age, with far-advanced mixed type of leprosy showed a progressive aggravation of the disease during the 13 years prior to treatment with promin. The course of treatment, of 24 months' duration, has consisted of 1,819 gm., averaging 2.5 gm. daily including rest periods. Several chronic ulcers of the legs have healed, as well as a few small ulcers of the face and hands. Nasal obstruction complicating a leprous rhinitis has been relieved. The patient has greater energy and stamina, but there is no definite objective improvement in leprous lesions.

Case 1206.—White male, 59 years old, has a far-advanced mixed type of leprosy of 9 years' duration. He was getting worse before the onset of the present treatment. A total of 1,814 gm. of promin was injected intravenously during a period of 24 months, an average of 2.8 gm. daily including rest periods. There were very extensive chronic ulcerations of the extremities. These have all healed with the exception of two leg ulcers which are small at present. Nasal obstruction and bleeding, symptoms of leprous rhinitis, are relieved. Previous to promin therapy this patient was confined to the infirmary because of general weakness and laryngeal leprosy with threatened suffocation. An emergency tracheotomy seemed indicated. He is now ambulatory with laryngeal condition improved. Improvement in this elderly patient is definite.

Case 661.—A white female, 27 years old, with moderately advanced lepromatous (nodular) leprosy of 15 years' duration was showing no evidence of improvement at the time of onset of the present treatment. Promin intravenously was given for 19 months, totaling 1,265 gm. Including rest periods, the average daily dose was 2.2 gm. Definite objective improvement is noted. Nodules on arms and legs are smaller and flatter. A few nodules have disappeared, leaving a brownish pigmentation. Improvement has been consistent to date.

Case 1229.—A colored male, 43 years of age, was under previous routine treatment for 6 years without any definite improvement. The disease is a moderately advanced mixed type of leprosy. Present treatment totals 717 gm. of promin

given during the course of 18 months for an average daily dose of 1.3 gm., counting the rest periods. Promin was at first administered orally, but toxic reactions prevented its continuation by this route. The greater part of the drug was administered intravenously. The first bacteriologically negative skin smear was recorded after 1 year of treatment. Because the patient disliked daily injections, sulfathiazole was finally substituted for promin. The manifestations of leprosy have gradually receded. There has been one skin smear showing an occasional acid-fast bacillus since the first negative report, but subsequent skin smears have again reverted to negative. It is felt that promin is responsible for the definite objective improvement in this case.

Case 1366.—White male, 38 years of age, has suffered from mixed type of leprosy of a moderately advanced stage for 13 years. The disease had recently become worse. The course of intravenous promin therapy was of 19 months' duration with short intervals of rest. A total of 2,011 gm. was given for an average of 3.5 gm. daily. This has resulted in a slight decrease in the size and elevation of the nodules of the face, chest, and arms. There has also supervened a marked increase in physical capacity for work. Improvement is slight in this patient.

Case 1294.—White male, 34 years of age, has had leprosy for 17 years. The disease was moderately advanced and predominantly lepromatous in type and considered stationary before starting treatment with promin intravenously. This treatment was administered for 17 months, during which time 1,523 gm. were injected, an average daily dose of 3 gm. There resulted a healing of leprous ulcers of the lips, mouth, and nose. Eight ulcerations of the legs, the largest 4 cm. in diameter and 2 mm. in depth, are also completely healed at present. Leprous infiltration of the face has diminished. During a rest period in December 1941 an erysipeloid reaction of the face developed and during a rest period in September 1942 a severe cystitis developed. Both conditions were relieved upon resumption of promin and have not recurred during the course of treatment. At one time granulocytopenia developed and the number of leukocytes dropped to a low of 3,000 with a polymorphonuclear count of 18 percent. This condition responded well to the temporary discontinuance of the drug and the injection of liver extract. The neutrophiles have remained within normal limits since then, in spite of resumption of full doses of promin. Improvement in this case seems objectively definite.

Case 1413.—White male, 57 years old, has had leprosy for 7 years. Prior to institution of promin therapy the disease had an unfavorable course and reached a moderately advanced stage of the mixed type. Promin was given irregularly because of poor veins. Orally it was found to produce too severe toxic reactions. For many months the patient received it by daily intramuscular injections in the buttock, which he tolerated in spite of the pain. In all 519 gm. were administered during a period of 17 months, averaging about 1 gm. daily. Poor veins and painful intramuscular injections were the cause for substituting sulfathiazole orally for promin. Under these treatments, skin infiltrations subsided and large ulcers of the lower extremities healed partially. The patient has finally succeeded in obtaining two successive negative bacteriologic skin smears at monthly intervals. The contribution of promin toward these negative tests, which occurred 5 months after the treatment was changed to sulfathiazole, is questionable. For this reason this case is tabulated as stationary in the following table.

Case 1078.—White male, 41 years of age, has moderately advanced lepromatous (nodular) leprosy of 9 years' duration. His condition had been stationary for a year previous to onset of promin therapy. This treatment consisted of 1,121 gm.

of promin given intravenously for a period of 16 months. In spite of several interruptions, because of multiple operations for a squamous carcinoma of the nose, the daily dose averaged 2.3 gm. It was observed that numerous nodules of the abdomen and arms became flattened or disappeared entirely, leaving small scars. During a prolonged period of cessation of treatment a few new nodules developed on the abdomen. These receded upon resumption of treatment. The patient at present has again been transferred to another hospital for further plastic operations on his nose. It is felt that improvement in this case is objective and definite, although not continuous due to frequent interruptions in treatment.

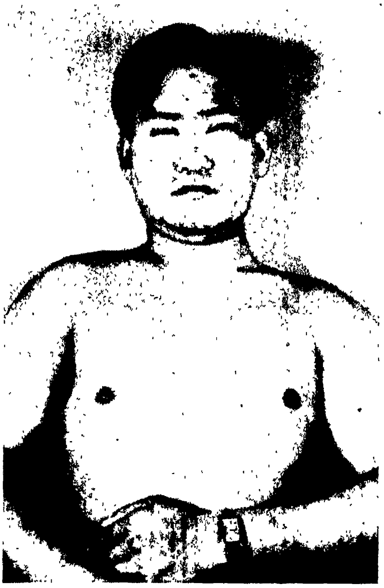
Case 953.—White male, 29 years of age, has had leprosy for 10 years. The disease progressed unfavorably prior to treatment. It is lepromatous (nodular) in type and moderately advanced. Treatment to the present has comprised the intravenous injection of 1,578 gm. of promin during a 16 months' period for an average of 3.2 gm. a day. Objective improvement is manifested by subsidence of lepromatous plaques of the face and a decrease in infiltration of the legs with some new growth of hair. The patient is encouraged over the results thus far obtained.

Case 1032.—White male, 28 years of age, has had leprosy for 10 years. The disease has grown progressively worse each year. At the start of promin therapy it had reached a far-advanced stage and was of mixed type. During the course of 16 months of treatment he was given 1,505 gm. of promin intravenously for an average of 3.1 gm. a day. The principal reason for starting treatment in this patient was the seriousness of ocular complications, leprous keratitis, and iridocyclitis, which were destroying his sight. Improvement in vision was definite. At the start of treatment the patient had to be led into the room for his injections. At present he reads 20/200 and Jaeger IV. Nasal discharge and epistaxis due to leprous rhinitis also ceased.

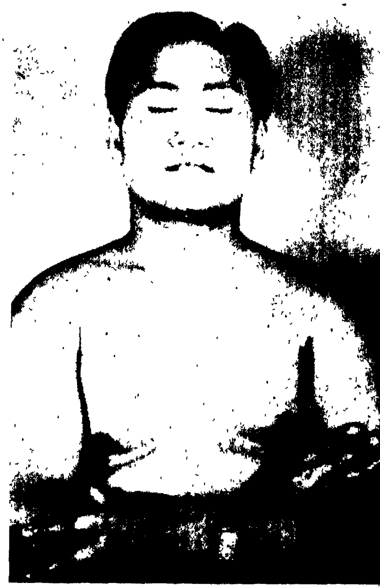
Case 1293.—White female, 34 years of age, has had leprosy for 17 years. At the time that promin therapy was started the disease was progressing unfavorably. Her case was classed as a moderately advanced lepromatous (nodular) type. At present she has had 15 months of treatment totaling 335 gm. and averaging only 0.7 gm. daily. The course and dosage were restricted because of allergic dermatitis which necessitated desensitization by gradually increasing doses commencing at 0.1 gm. intravenously. A tendency to anemia which responded only fairly well to liver, ventrex, and inorganic iron also resulted in frequent interruptions in the course of treatment. It is observed that some pigmented infiltrated lesions of the arms and thighs are subsiding under the influence of treatment. This improvement, however, has been gradual and is as yet slight, so that this case is recorded as still stationary.

Case 1195.—White male, 33 years of age, has had leprosy 12 years. The disease has shown no tendency to improve, and was a moderately advanced lepromatous (nodular) type at the start of the promin treatment. This therapy, started 14 months ago, amounts to 1,072 gm., the average daily dose being 2.5 gm. The manifestation of leprosy in this patient is a diffuse mottled infiltration of the skin of the entire body. Under promin therapy there has occurred a gradual but not a pronounced fading of these lesions. His condition is classed as stationary until and unless more marked improvement is noted.

Case 575.—White male, 37 years of age, has had leprosy for 18 years. The disease is a far-advanced mixed type with total blindness. A threatened respiratory obstruction from advancing leprous laryngitis was the reason for starting promin therapy in this patient. Intravenous treatment so far has consisted of 1,251 gm. of promin during a 13 months' period, which averaged 3.2 gm. a day. The laryngeal condition has improved. A nasal mucosal leprosy which prevented free nasal breathing also responded favorably. Five leprous ulcerations of the extremities have healed. Leprotic skin infiltration has subsided and skin smears



Case 869. March 1, 1941, before promin treatment.



Case 869. April 2, 1943, 2 years after promin treatment was started.

Case 1206. May 1, 1941, before promin treatment.

Case 1206. May 2, 1943, 2 years after promin treatment was started.

Case 918. April 1, 1942, before promin treatment.

Case 918. April 2, 1943, after 1 year of promin treatment.

Case 1481. February 1, 1942, before promin treatment.

Case 1481. April 2, 1943, after 1 year of promin treatment.

have become bacteriologically negative for the last 3 consecutive months. Improvement has been unmistakable.

Case 1033.—Chinese male, 25 years of age, has moderately advanced lepromatous leprosy of 8 years' duration. At present he has received 811 gm. of promin intravenously during 13 months, the average daily dose being 2.3 gm. Close examination shows no demonstrable effect of promin on the leprosy for either better or worse.

Case 576.—White male, 21 years of age, has suffered from leprosy for 15 years. The disease had become far advanced and of the mixed type before promin therapy was tried. This patient also had severe chronic nephritis. Promin was administered intravenously in moderate doses for 13 months, averaging about 1 gm. daily and totaling 391 gm. A marked leprous iridocyclitis subsided but there was no improvement of leprous keratitis noted. Visual acuity did not improve but frequent nocturia was lessened. Nitrogen retention was not materially altered but dropped 20 points since the last resumption of promin 6 weeks ago. This patient's condition is still serious and at present is considered worse than at the start of treatment.

Case 689.—White male, 49 years of age, who has had leprosy 18 years, was a far-advanced mixed type before starting on promin. During 13 months 1,325 gm. were administered intravenously for an average daily dose of 3.3 gm., including the rest periods. Rapidly failing vision due to leprous keratitis and iridocyclitis was the reason for trying promin. Iridocyclitis subsided but the keratitis remained the same. Nasal obstruction due to a leprous rhinitis is greatly relieved. Multiple ulcers of the legs have healed under the influence of promin. Two periods of interruption of treatment were necessary for excision of a squamous cell carcinoma of lower lip and a subsequent plastic repair. Improvement in this case is regarded as definite, although most of it may be attributed to clearing up of secondary infections.

Case 1148.—White male, 39 years of age, has had leprosy for 10 years. The disease was becoming worse and was of a moderately advanced mixed type at onset of promin therapy. Course of treatment consisted of 1,126 gm. of promin intravenously during a period of 12 months, the average daily dose being 3.1 gm. including days of rest. Leprous laryngitis was the reason for instituting treatment in this case. This manifested itself by hoarseness and a tendency to aphonia and dyspnoea. These symptoms were favorably influenced by promin. Scleroderma of lower legs diminished, and ulcers healed. Nodules on the legs became smaller.

Case 1196.—White male, 29 years of age, who has had leprosy 8 years, had shown no definite change previous to promin treatment. The disease was moderately advanced and lepromatous (nodular) in type. He received a total of 856 gm. of promin intravenously during 12 months, an average daily dose of 2.3 gm. Improvement is manifested in subsidence of skin infiltration and nodules of ear lobes. Objective improvement is reflected in the report of the patient's first negative skin test after 11 months on promin therapy.

Case 918.—Filipino male, 19 years of age, has had leprosy for 12 years. The disease is moderately advanced and of mixed type. At onset of promin therapy prognosis seemed poor, as the disease was progressing unfavorably. A total of 889 gm. of promin was administered intravenously during 12 months, which is an average daily dose of 2.4 gm. A decrease in the amount of infiltration and nodulation of the face and body has become evident. There is also a moderate lessening of scleroderma of the legs. In spite of this improvement, the patient has suffered several acute lepra reactions with erythema nodosum and has lost 5 pounds in weight.

Case 1399.—White male, 20 years of age, has had leprosy for 4 years. The disease is maculo-anesthetic in type and of a moderately advanced stage. Promin therapy was commenced 12 months ago. At first it was given orally, but this method of administration had to be discontinued because of a gastro-intestinal disturbance and the development of hemolysis. The greater part of the 848 gm. of promin was given intravenously, an average of 2.2 gm. daily including rest periods. Macules of the body have faded to some extent. Nasal obstruction was markedly alleviated. In this case in addition to parenteral therapy a 5-percent solution of promin was used as a nasal spray. Skin smears are showing a smaller number of acid-fast bacilli, and the last nasal smear is reported negative.

The following table is a summation of the results of intravenous promin therapy in the patients whose case histories are reported here, each of whom has taken at least 12 months of treatment.

TABLE 1

Type	Number	Improved	Stationary	Worse	Bacteriologic reversion from positive to negative
Mixed, far advanced	6	3	2	1	1
Mixed, moderately advanced	5	4	1	0	1
Lepromatous, far advanced	1	1	0	0	0
Lepromatous, moderately advanced	9	6	3	0	3
Neural, moderately advanced	1	1	0	0	0
Total	22	15	6	1	5

Not included in these case reports or in table 1 are 46 additional patients who have taken a shorter course of promin intravenously. Some of them are beginning to show signs of improvement, and a few have reverted from a positive to a negative bacterioscopy. The duration of treatment in this more recent group of patients varies from 2 to 11 months and averages 8 months. The preliminary results of intravenous promin therapy in this group are briefly indicated in table 2. Also shown in this table are the number of patients in whom bacteriologic tests became negative and those in whom treatment was discontinued for one reason or another.

TABLE 2

Type	Number	Objective improvement	Stationary	Worse	Bacterioscopy negative	Treatment discontinued
Mixed, far advanced	4	1	3	0	0	2
Mixed, moderately advanced	14	6	6	2	1	6
Lepromatous, far advanced	5	3	2	0	1	0
Lepromatous, moderately advanced.	13	8	4	1	2	2
Lepromatous, minimal	4	3	1	0	1	1
Neural, moderately advanced.	5	4	1	0	2	0
Neural, minimal	1	1	0	0	0	0
Total	46	26	17	3	7	11

In these more recently treated cases it can be seen that an attempt was made to select a more favorable and less advanced type of disease.

There were 16 patients altogether in whom treatment was discontinued for various reasons. This number includes a few patients taking less than 2 months' treatment, who are not otherwise included in this report. The reasons for discontinuing treatment were as follows: Refusal of patient to cooperate, 5; repeated acute leprae reactions with erythema nodosum, 4; patients absconding (improved nodular cases), 2; exfoliative dermatitis, 1; leucopenia, 1; previous advanced nephritis, 1; and increased icteric index in a patient with previous hepatitis due to sulfanilamide, 1.

The following table gives pertinent data on all cases which reverted from a positive to a negative bacterioscopy under the influence of promin therapy.

TABLE 3

Registration number	Months of treatment before first negative report	Amount of promin required before first negative report, in grams	Number of negatives	Registration number	Months of treatment before first negative report	Amount of promin required before first negative report, in grams	Number of negatives
869	24	1,926	1	1417	8	365	1
1229	13	298	1	1500	8	427	1
1413	24	[1] 519	2	817	7	794	1
575	9	948	3	1123	6	692	3
1196	11	756	1	1492	6	240	3
1343	10	485	1	1514	6	373	1

[1] In addition to 233 gm. of sulfathiazole.

Because leprosy is a chronic disease subject to periods of spontaneous remissions more or less prolonged, it may be difficult to determine whether improvement under any new experimental treatment is entirely due to the remedy under study or not. However, the writers feel that the large number of patients showing improvement in contrast to the small number in whom unfavorable progress was made under promin therapy cannot well be explained on the basis of spontaneous improvement alone.

To test this impression a control experiment was undertaken with a prominlike drug, Internal Antiseptic 307, which was administered orally in capsules to one group of patients while a placebo, lactose with a trace of quinine, in similar capsules was given to another group of patients. The placebo was similar in appearance and taste to the active drug, and none of the patients taking it suspected that they were not being actively treated. Internal Antiseptic 307 chemically is sodium-4,4′-diaminodiphenylsulfone-2-acetylsulfonamide. Being closely related chemically to promin, it was found to have a similar action in leprosy. It was chosen for oral administration instead of promin, which is too toxic when given by mouth. Internal Antiseptic 307 is a Parke Davis product and was furnished gratis by this firm for this experiment.

There was less objection in this institution to the administration of a placebo orally than by the intravenous route, as it would have been more difficult to manage a control series of patients on intravenous injections without arousing their suspicion. The group of patients taking the I. A. 307 and those of the control group were closely matched as to type and stage of the disease. The dosage of the drug and of the placebo were the same, varying from 5 to 15 gr. daily and averaging 10 gr. It was necessary to use these small doses of I. A. 307 to obviate toxic reactions, since this drug has cumulative properties. The patients of both groups were handled in exactly the same manner. During the course of treatment complete blood counts and urinalyses were done every 2 weeks on all patients of both groups. Antianemic therapy was administered to patients of either group whenever indicated by the laboratory findings.

After a period of over 8 months it became apparent that there was a difference in the condition of the two groups of patients. While the course of the disease continued unabated in the control group, it was checked in a considerable percentage of the treated patients. Complications of the disease, such as ulcerations, rhinitis, laryngitis, and iridocyclitis, frequently improved under I. A. 307 but were unaffected in the control patients. A comparison of the results after more than 9 months of treatment is given for the two groups in table 4. In this table under complications are included: chronic ulcerations, leprous rhinitis, leprous laryngitis, and iridocyclitis.

TABLE 4

	Internal Antiseptic 307	Control
Number of patients	20	20.
Improvement in leprosy	6 (30 percent)	1 (5 percent).
No change in leprosy	5 (25 percent)	9 (45 percent).
Leprosy worse	3 (15 percent)	5 (25 precent).
Improvement limited to complications	5 (25 percent)	0.
Complications worse	1 (10 percent)	5 (25 percent).
Bacterioscopy becoming negative	2	0.

Data in the above table seem to indicate that improvements in leprosy under promin and prominlike drugs cannot be attributed only to spontaneous remissions in the course of the disease.

CONCLUSIONS

Promin is the sulfonamide drug which thus far seems to possess to the greatest extent some chemotherapeutic properties against leprosy.

While no direct evidence of a specific bacteriostatic or bacteriocidal action against M. leprae has been demonstrated, it has been observed that promin appears capable of inhibiting the progress of leprosy in

a considerable percentage of cases. As yet no case of leprosy has become arrested under its influence.

It is found that promin can be safely administered intravenously for prolonged periods, provided the blood and urine are examined frequently. When these precautions are taken, toxic manifestations are relatively rare and mild. The most important of them, hemolysis, if recognized early, is usually controllable and not a cause for discontinuance of treatment.

Further experimental and clinical studies on the treatment of leprosy with promin must be conducted before more definite conclusions can be drawn as to its therapeutic value.

It is not claimed that promin is a specific for leprosy, but in the writers' estimation it is an advance in the right direction in the therapy of this disease.

Promin can be considered to have opened a new avenue in the chemotherapy of the mycobacterial diseases. It is hoped that further synthesis of sulfa compounds may produce a substance which will succeed in saving countless lives in this still dark field of medicine.

ACKNOWLEDGMENTS

The writers wish to give credit to Dr. F. D. McCreary, at present a major in the Medical Corps of the United States Army, for the administration of promin during the first 5 months of this study, his interest in the work, and his notes and observations of cases while stationed at the United States Marine Hospital, Carville, La. They also wish to express their appreciation to Sister Hilary Ross and Joseph Q. Heplar for their cooperation in the extensive laboratory work carried on in connection with this experimental study, and to Sister Hilary Ross for the estimation of the promin and Internal Antiseptic 307 concentrations in the blood.

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EXPERIMENTAL TRANSMISSION OF THE RICKETTSIAE OF THE SPOTTED FEVERS OF BRAZIL, COLOMBIA, AND THE UNITED STATES BY THE ARGASID TICK *ORNITHODOROS NICOLLEI* [1]

By Gordon E. Davis, *Senior Bacteriologist, United States Public Health Service*

The transmisson of the rickettsiae of the spotted fevers by *Ornithodoros parkeri* has been reported (*1*) and attention has been called to the potential importance of this tick as a vector in nature in the United States. The results of similar studies with a Mexican species, *O. nicollei*, are now presented. In all experiments ticks in the first nymphal stage were used for the infective feeding and blood from guinea pigs infected with spotted fever of the United States was used for the immunity tests.

SPOTTED FEVER OF BRAZIL

Ticks used in experiments 1, 2, and 3 were given their infective feeding on the same guinea pig host infected with the spotted fever of Brazil; 25 first nymphs engorged on the second day of fever, 25 on the third, and 25 on the fourth. Five days after the infective feeding, 5 engorged nymphs from each lot were ground in saline and injected into a guinea pig. None of the 3 recipient guinea pigs showed fever. Further testing of the ticks from experiments 1 and 3 by feeding and by subsequent injection indicated that none of the ticks had acquired the infective agent. In experiment 2, 1 guinea pig became infected at the second and 1 at the sixth test feeding.

In experiments 4 and 5, 44 and 76 ticks, respectively, engorged on a guinea pig on the third and fourth days of fever. Directly after engorgement 5 ticks from each group were ground in saline and injected into 2 fresh guinea pigs. One guinea pig died following 7 days of fever. The spleen was three times normal, adhesions of the tunica vaginalis were present, and there was extensive scrotal sloughing. The other guinea pig reacted with 9 days of fever and was subsequently immune to spotted fever. None of the remaining ticks were shown to be infective at the first test feeding. At the second test feeding 3 of 4 guinea pigs were infected by ticks from the first lot and 4 of 5 by ticks from the second lot. At the third test feeding all 13 guinea pig hosts became infected. Six showed scrotal swelling and all were immune to spotted fever. As the result of continued test feedings, 45 guinea pigs were infected. Seventeen reacted with scrotal edema, 5 died, and the remainder were shown to be immune. The prefebrile periods varied from 3 to 7 days, with 5 days in a majority

[1] From the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

of cases; the febrile periods from 4 to 10 days, and in 42 of the 45 guinea pig hosts the temperature reached 41.0° C. or higher. The onset of the febrile periods was abrupt and termination in surviving guinea pigs was by lysis.

F1 generation: Transmission through the egg was demonstrated in experiments 2, 4, and 5. At the larval feeding 6 guinea pigs became infected. Five of these showed scrotal edema and 1 on which 11 larvae engorged showed extensive scrotal sloughing. Four died of spotted fever; the 2 surviving guinea pigs developed pneumonia following the immunity test. The prefebrile periods were unusually short, varying from 2 to 4 days. Thus far, all groups of ticks shown to be infective as nymphs were also shown to be infective as larvae. In reported experiments with *O. parkeri* (*2*) it was shown that larvae may infect the host but that as a rule infectivity is not apparent before the first nymphal feeding.

SPOTTED FEVER OF COLOMBIA

Twenty-five first nymphs engorged on a guinea pig infected with the spotted fever of Colombia on the second day of fever and 25 on the third day of fever. Five days after the infective feeding 5 ticks from each lot were ground in saline and injected into 2 fresh guinea pigs. The recipient guinea pigs died of spotted fever on the tenth and twelfth days, respectively. The remaining ticks from lot 1 were shown to be infective at the second, fifth, and seventh test feedings, and from lot 2 at the fifth and sixth test feedings. Seven host guinea pigs became infected. Two reacted with scrotal edema, 2 died, and the surviving 5 were immune to spotted fever.

F1 generation: Four larvae from an infective female engorged on a guinea pig. There was a prefebrile period of 4 days, with death on the eighth day of fever. The spleen was four times normal, the testes and adnexa were deeply injected, and there was a slight scrotal sloughing.

SPOTTED FEVER OF THE UNITED STATES

Twenty and 25 first nymphs, respectively, engorged on a guinea pig infected with spotted fever of the United States on the fourth and fifth days of fever. Five days after the infective feeding 5 engorged nymphs from each lot were ground in saline and tested for infectivity by injection. The guinea pig receiving nymphs engorged on the fourth day of fever died of spotted fever 13 days later, while the guinea pig that received ticks engorged on the fifth day of fever showed no evidence of infection. None of the remaining ticks were shown to be infective at the first test feeding. At the second test

feeding the 15 remaining ticks from the first lot caused 9 days of fever and subsequent immunity and 18 surviving ticks from the second lot infected 2 of the 3 guinea pig hosts. At the third and fourth test feedings 7 additional guinea pigs became infected. Four showed scrotal edema and 1 extensive scrotal sloughing. Four died and the remaining 3 were shown to be immune. As it was necessary to terminate the experiment, transmission to the next generation was not demonstrated.

DISCUSSION

Spotted fever has not been reported from Mexico. However, it hardly seems credible that a disease present in southwestern Canada, throughout the United States, in Colombia, and Brazil should be entirely absent from Mexico and Central America. Both endemic and epidemic typhus are present in Mexico, and in this connection it should be remembered that only recently spotted fever and endemic typhus have been differentiated in our own southern States.

Results of these experiments show that *O. nicollei*, reported as present in native houses and parasitic on dogs and man in Mexico, is a very efficient vector in the laboratory, and, of the numerous species of *Ornithodoros* tested, is equalled as a transmitter only by *O. parkeri* from the western States.

SUMMARY

The argasid tick *Ornithodoros nicollei* engorged in the first nymphal stage on guinea pigs infected with the spotted fevers of Brazil, Colombia, and the United States, respectively, subsequently transmitted the specific agents by feeding on fresh guinea pigs. The ticks remain infective throughout the nymphal and adult stages and transmit the rickettsiae of Brazilian and Colombian spotted fever through the egg to the next generation.

Observations suggest that larvae may be the most efficient transmitters as they attach firmly while ticks in the later stages are easily dislodged. Furthermore, evidence of infection is apparent earlier following the larval feeding than following feeding in the later developmental or adult stages.

As this tick is parasitic on man and dogs, it may be considered a potential vector in Mexico.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

October 10–November 6, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended November 6, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

DISEASES ABOVE MEDIAN PREVALENCE

Meningococcus meningitis.—The number of cases of meningococcus meningitis rose from 696 during the preceding 4-week period to 855 during the 4 weeks ended November 6. An increase of this disease is normally expected at this time of the year, but the rate of increase during the current period was considerably above normal, especially in regions along the Atlantic Coast and in the East North Central and South Central regions. States reporting rather sharp increases during the current 4-week period (figures for preceding 4 weeks in parentheses) are as follows: New York 134 (89), Pennsylvania 62 (48), Ohio 45 (27), Missouri 29 (17), Virginia 33 (16), Tennessee 22 (13).

Compared with preceding years the incidence for the country as a whole was the highest on record for this period. The number of cases (855) was 3.6 times last year's figure for these same weeks and 6.3 times the 1938–42 median. In each geographic region except the West North Central the current incidence was the highest in the 15 years for which these data are available. During the epidemics of 1928–30 and 1935–36 the cases for this period totaled 384 and 273, respectively.

Poliomyelitis.—The number of cases of poliomyelitis dropped from 3,032 during the 4 weeks ended October 9 to 1,544 during the current 4-week period. A decline in the incidence was reported from all regions of the country. Compared with preceding years, however, the incidence remained at a relatively high level, the number of cases being 2.5 times that for the corresponding period in 1942 and 1.3 times the 1938–42 median. In the South Atlantic and East South Central regions the incidence was below the normal seasonal expectancy but in all other regions the number of cases was considerably above the median, the number of cases ranging from 1.5 times the median in the North Central regions to almost 7 times the median in the Mountain and Pacific regions.

Influenza.—For the 4 weeks ended November 6 there were 5,581 cases of influenza reported, as compared with 5,404 in 1942 and a 1938–42 median of 3,836 cases. While the current incidence closely approximated that of last year, it represented an increase of about 45 percent over the normal seasonal expectancy. However, the increase appeared to be due largely to the high incidence reported in the State of Texas; more than one-half of the total number of cases reported occurred in that State. In other regions the numbers of cases either closely approximated the median or fell considerably below it.

Measles.—The number of cases of measles was above the normal seasonal expectancy in all regions except the Mountain and Pacific. The number of cases (9,773) reported for the country as a whole represented an increase of more than 45 percent over the number for the corresponding period in 1942, which number (5,283) also represented the 1938–42 median for this period. The disease was most prevalent in the Atlantic Coast and North Central regions; in both of the latter regions the number of cases was more than 5 times the median.

Scarlet fever.—The incidence of scarlet fever was also relatively high, 9,981 cases being reported for the current period, as compared with a 1938–42 median of 8,900 cases. In the New England and Pacific regions the incidence was about twice the normal expectancy, the Mountain region reported a 50-percent increase, and other regions from 10- to 20-percent increases. The current incidence is the highest for this period since 1938, when approximately 11,000 cases were reported.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended November 6 there were 1,665 cases of diphtheria reported. The 1938–42 median for this period was 2,484 cases. The Pacific region reported an increase of cases over the median and in the New England and West North Central regions the incidence was about normal; in other regions the numbers of cases were relatively low.

Smallpox.—This disease continued at a comparatively low level. There were 20 cases reported for the current period, as compared with 45 for the corresponding period in 1942 and the 1938–42 median was 77 cases. The incidence was the lowest on record for this period.

Typhoid fever.—The incidence of typhoid and paratyphoid fever was the lowest on record for this period. The number of cases (414) reported for the 4 weeks ended November 6 was less than 70 percent of last year's figure and less than 50 percent of the 1938–42 median for the same weeks. In the New England region the incidence was about normal, but in all other regions the numbers of cases were considerably below the median.

Number of reported cases of nine communicable diseases in the United States during the 4-week period October 10–November 6, 1943, the number for the corresponding period in 1942, and the median number of cases reported for the corresponding period, 1938–42

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,665	2,484	2,484	5,581	5,404	3,836	9,773	5,283	5,283
New England	25	24	27	17	25	7	982	1,125	725
Middle Atlantic	83	136	138	46	75	50	1,389	926	862
East North Central	230	265	265	105	214	214	3,435	651	651
West North Central	133	117	128	31	50	50	1,905	297	352
South Atlantic	476	946	1,038	1,612	1,874	1,499	954	111	412
East South Central	271	363	363	240	293	241	158	80	80
West South Central	234	432	432	2,977	2,250	1,127	186	93	128
Mountain	53	73	73	396	448	395	413	745	536
Pacific	160	128	106	157	175	124	351	1,255	1,078
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	855	237	135	1,544	600	1,163	9,981	8,900	8,900
New England	91	31	8	123	34	29	830	863	456
Middle Atlantic	231	85	27	155	99	99	1,562	1,382	1,382
East North Central	170	27	25	319	130	215	2,675	2,347	2,355
West North Central	42	7	9	165	109	109	1,156	1,039	1,039
South Atlantic	129	39	26	26	38	69	1,506	1,434	1,216
East South Central	64	16	19	20	34	58	601	756	729
West South Central	37	5	8	115	64	49	320	355	350
Mountain	18	1	3	127	19	19	386	196	257
Pacific	73	26	7	494	73	73	945	528	528
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	20	45	77	414	599	888	9,242	10,795	12,053
New England	0	0	0	27	30	25	778	1,349	1,041
Middle Atlantic	0	0	0	52	77	120	1,909	3,357	3,357
East North Central	7	4	24	51	129	124	2,416	2,782	3,656
West North Central	6	14	20	22	20	59	679	446	533
South Atlantic	2	8	0	92	120	212	1,432	857	1,130
East South Central	3	2	5	39	63	128	396	291	463
West South Central	1	9	9	74	90	164	379	529	387
Mountain	1	2	4	30	42	56	452	292	334
Pacific	0	6	6	27	19	52	801	892	892

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.

Whooping cough.—For the current 4-week period there were 9,242 cases of whooping cough reported, as compared with 10,795 during the corresponding period in 1942 and a 1938–42 median of approximately 12,000 cases. The South Atlantic, West North Central, and Mountain regions reported a few more cases than have normally been reported at this season but in all other regions the incidence was below the normal seasonal level.

MORTALITY, ALL CAUSES

For the 4 weeks ended November 6 there were approximately 34,500 deaths from all causes in the group of large cities reporting to the Bureau of the Census. The number was about 6.6 percent more than the average for the corresponding weeks of the 3 preceding years.

The monthly death rate from all causes among persons in the industrial department of the Metropolitan Life Insurance Co. has been above the corresponding month of the preceding year for every month from October to September, inclusive, the latest data available. The average of the excesses in the rates for these 12 months over the months of the preceding year was 8.3 percent.

DEATHS DURING WEEK ENDED NOVEMBER 13, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce

	Week ended Nov. 13, 1943	Corresponding week, 1942
Data for 90 large cities of the United States:		
Total deaths	8,540	8,629
Average for 3 prior years	8,377	
Total deaths, first 45 weeks of year	407,248	378,437
Deaths under 1 year of age	621	621
Average for 3 prior years	563	
Deaths under 1 year of age, first 45 weeks of year	29,227	26,161
Data from industrial insurance companies:		
Policies in force	66,035,045	65,344,143
Number of death claims	12,330	10,393
Death claims per 1,000 policies in force, annual rate	9.7	8.3
Death claims per 1,000 policies, first 45 weeks of year, annual rate	9.7	9.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 20, 1943

Summary

A total of 265 cases of meningitis was reported, as compared with 223 for the preceding week. The current incidence is approximately 9 times the 5-year (1938–42) median of 30 cases. The total number of cases reported since the beginning of the fourth quarter of the year is 1,534, as compared with a 5-year median of 233 for the same period. Reports for the current week show increased incidence in all of the 9 major geographic areas except the Middle Atlantic and the West South Central. Increases were shown in 11 States which reported 7 to 24 cases each, representing all sections except the West South Central and Mountain States. In States reporting 6 or more cases, decreases were recorded in New Jersey, Missouri, and Virginia. New York reported 33 cases, the same number as for the preceding week. A total of 16,061 cases has been reported to date for the country as a whole as compared with 3,103 for the same period last year.

A further decrease was reported in the incidence of poliomyelitis. A total of 221 cases was reported, as compared with 243 for the preceding week and a 5-year median of 163. Only 7 States reported more than 6 cases each, as follows (last week's figures in parentheses): New York 12 (17), Illinois 24 (26), Kansas 11 (11), Texas 12 (9), Washington 30 (8), Oregon 17 (19), and California 54 (62).

A total of 11,843 cases has been reported to date, as compared with 3,833 for the same period last year and a 5-year median of 6,793 for the corresponding period.

Cumulative figures to date for other diseases included in the following table (last year's corresponding figures in parentheses) are as follows: Anthrax, 61 (72); diphtheria 11,921 (13,452); dysentery, all forms, 21,154 (18,551); infectious encephalitis, 623 (522); influenza, 95,943 (94,637); leprosy, 27 (43); measles, 591,941 (480,638); Rocky Mountain spotted fever, 432 (450); scarlet fever, 121,996 (110,559); smallpox, 676 (707); tularemia, 707 (772); typhoid and paratyphoid fever, 5,085 (6,303); endemic typhus fever, 3,931 (3,292); whooping cough, 164,249 (159,129).

Deaths recorded in 89 large cities of the United States for the week totaled 8,888 for the current week, as compared with 8,439 last week and a 3-year (1940–42) average of 8,515. The cumulative figure for the first 46 weeks of the year is 412,318, as compared with 384,588 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended November 20, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Nov. 20, 1943	Nov. 21, 1942		Nov. 20, 1943	Nov. 21, 1942		Nov. 20, 1943	Nov. 21, 1942		Nov. 20, 1943	Nov. 21, 1942	
NEW ENGLAND												
Maine	0	1	1	------	1	1	112	5	46	3	1	0
New Hampshire	0	0	0	------	------	------	0	30	4	0	0	0
Vermont	0	0	0	------	------	------	2	120	9	0	0	0
Massachusetts	14	1	5	------	------	------	224	261	219	16	4	3
Rhode Island	1	1	0	------	------	------	62	0	2	2	2	0
Connecticut	3	2	0	3	3	1	3	72	45	4	0	0
MIDDLE ATLANTIC												
New York	13	13	17	[1] 5	[1] 16	[1] 11	281	207	207	33	12	3
New Jersey	0	4	12	16	4	10	282	20	18	6	1	1
Pennsylvania	8	14	18	3	------	------	222	447	220	23	2	4
EAST NORTH CENTRAL												
Ohio	16	14	18	3	3	10	259	21	21	13	3	0
Indiana	20	11	13	9	22	4	111	16	18	5	0	0
Illinois	8	26	27	4	9	9	64	33	33	9	1	1
Michigan [2]	6	9	9	2	6	------	281	49	117	21	5	0
Wisconsin	4	2	2	18	28	28	329	66	98	4	0	0
WEST NORTH CENTRAL												
Minnesota	9	3	3	1	------	------	725	1	28	7	0	0
Iowa	2	4	4	------	4	2	96	28	28	2	0	0
Missouri	1	12	13	3	------	1	4	8	8	8	0	0
North Dakota	1	2	2	------	2	4	226	1	4	1	1	0
South Dakota	4	3	1	1	------	1	4	19	5	0	0	0
Nebraska	5	2	2	3	8	------	5	50	2	0	0	0
Kansas	10	8	6	9	1	4	9	28	22	0	2	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	6	1	0	3	1	0
Maryland [3]	6	17	14	2	4	7	21	21	21	7	3	0
District of Columbia	1	0	1	------	2	1	9	1	1	5	0	0
Virginia	12	25	35	168	157	148	62	6	37	10	3	2
West Virginia	5	9	12	------	25	13	50	4	17	2	0	0
North Carolina	27	49	63	1	9	7	68	2	98	9	0	1
South Carolina	8	28	24	295	439	306	6	5	5	1	1	0
Georgia	14	25	29	34	35	35	24	8	9	4	2	0
Florida	20	16	11	7	3	3	24	5	5	5	0	0
EAST SOUTH CENTRAL												
Kentucky	8	12	12	1	7	10	11	19	12	9	1	1
Tennessee	15	15	22	25	28	38	15	15	15	7	4	0
Alabama	25	15	27	60	53	55	67	2	8	3	1	2
Mississippi [2]	11	10	18	------	------	------	------	------	------	2	1	0
WEST SOUTH CENTRAL												
Arkansas	8	11	23	45	53	54	28	8	8	0	1	1
Louisiana	13	13	10	15	10	10	20	3	1	3	1	0
Oklahoma	2	17	22	39	65	57	13	2	5	0	1	0
Texas	43	58	58	716	553	247	63	7	14	2	0	0
MOUNTAIN												
Montana	5	2	2	5	------	------	85	7	9	0	0	0
Idaho	2	1	0	------	1	------	1	19	18	0	3	0
Wyoming	0	0	1	1	31	------	3	14	4	0	0	0
Colorado	11	14	14	30	39	22	46	7	22	0	0	0
New Mexico	0	1	1	19	1	1	0	8	8	1	0	0
Arizona	7	1	5	163	84	84	3	8	8	0	0	0
Utah [2]	0	0	0	6	------	6	3	188	23	4	0	0
Nevada	0	0	0	------	------	------	0	5	0	0	0	0
PACIFIC												
Washington	8	0	1	------	------	------	49	408	15	3	1	0
Oregon	2	0	3	3	17	12	23	189	19	4	0	0
California	30	22	22	19	46	46	64	39	162	24	6	1
Total	408	493	602	1,734	1,769	1,711	4,065	2,483	2,483	265	64	30
46 weeks	11,921	13,452	13,903	95,943	94,637	160,713	561,941	480,638	480,638	16,061	3,103	1,798

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 20, 1943, and comparison with corresponding week of 1942 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	Nov. 20, 1943	Nov. 21, 1942		Nov. 20, 1943	Nov. 21, 1942		Nov. 20, 1943	Nov. 21, 1942		Nov. 20, 1943	Nov. 21, 1942	
NEW ENGLAND												
Maine	0	0	0	18	9	8	0	0	0	0	1	1
New Hampshire	2	0	0	10	4	7	0	0	0	0	1	0
Vermont	0	1	0	1	3	2	0	0	0	0	0	0
Massachusetts	4	1	1	187	245	123	0	0	0	5	0	1
Rhode Island	1	0	0	6	12	5	0	0	0	0	0	0
Connecticut	6	0	0	-39	38	35	0	0	0	1	0	2
MIDDLE ATLANTIC												
New York	12	2	6	290	240	236	0	0	0	7	8	8
New Jersey	0	3	3	98	39	85	0	0	0	4	3	3
Pennsylvania	3	2	8	179	136	189	0	0	0	6	4	10
EAST NORTH CENTRAL												
Ohio	4	0	7	288	169	210	0	0	0	2	2	10
Indiana	0	1	1	90	53	86	7	2	1	0	1	1
Illinois	24	11	11	115	162	250	0	0	1	0	3	3
Michigan [2]	4	1	5	129	93	178	0	0	3	3	2	2
Wisconsin	3	2	4	143	204	117	1	1	1	0	0	0
WEST NORTH CENTRAL												
Minnesota	1	3	3	56	47	64	0	0	2	0	2	0
Iowa	3	1	1	78	51	52	0	0	1	4	5	2
Missouri	1	3	2	49	64	64	0	0	1	0	0	2
North Dakota	0	0	0	9	11	16	0	0	0	0	0	0
South Dakota	0	0	0	12	16	16	0	0	0	0	0	0
Nebraska	0	4	2	17	15	17	1	1	0	1	0	1
Kansas	11	2	1	74	83	85	0	0	0	0	2	2
SOUTH ATLANTIC												
Delaware	0	0	0	7	10	9	0	0	0	1	0	0
Maryland [2]	2	0	1	32	25	40	0	0	0	1	3	4
District of Columbia	0	0	0	11	13	10	0	0	0	0	0	1
Virginia	0	0	2	44	84	79	0	0	0	2	1	8
West Virginia	0	1	1	79	45	67	0	0	0	0	0	5
North Carolina	0	0	2	123	85	85	0	0	0	2	2	2
South Carolina	1	2	2	12	21	21	0	0	0	1	2	3
Georgia	1	1	1	29	57	43	0	0	0	0	3	9
Florida	0	3	1	10	9	9	0	0	0	4	1	3
EAST SOUTH CENTRAL												
Kentucky	1	4	3	43	56	56	1	1	0	1	3	12
Tennessee	1	2	2	47	68	91	0	0	1	2	10	5
Alabama	2	0	0	15	33	42	0	0	0	1	1	3
Mississippi [2]	0	3	2	14	43	15	0	0	0	2	5	3
WEST SOUTH CENTRAL												
Arkansas	0	0	1	12	22	21	0	1	1	4	4	4
Louisiana	3	0	0	10	10	10	0	0	0	8	8	8
Oklahoma	5	0	1	73	20	23	0	0	1	6	0	3
Texas	12	14	3	55	62	62	3	0	0	14	5	9
MOUNTAIN												
Montana	0	0	0	19	8	26	0	0	0	1	1	1
Idaho	0	1	1	30	8	7	0	1	0	1	1	1
Wyoming	3	0	0	5	5	5	0	0	0	0	0	0
Colorado	0	2	0	37	36	29	0	1	1	1	2	2
New Mexico	4	0	0	8	10	10	0	1	0	2	4	3
Arizona	0	0	0	26	5	6	0	0	0	1	1	1
Utah [2]	6	0	1	36	19	15	0	0	0	3	0	1
Nevada	0	0	0	2	0	0	0	0	0	1	0	0
PACIFIC												
Washington	30	3	1	91	24	30	0	0	0	1	1	1
Oregon	17	4	3	53	16	16	0	0	0	0	0	3
California	54	23	2	242	146	146	0	0	1	2	2	6
Total	221	100	163	3,053	2,634	2,651	13	9	44	95	94	176
46 weeks	11,843	3,833	6,793	121,996	110,559	138,396	676	707	2,176	5,085	6,303	8,911

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 20, 1943, and comparison with corresponding week of 1942 and 5-year median—Continued

Divison and State	Whooping cough			Week ended Nov. 20, 1943								
	Week ended		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Nov. 20, 1943	Nov. 21, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	17	65	36	0	0	0	0	0	0	0	0	0
New Hampshire	0	1	1	0	0	0	0	0	0	0	0	0
Vermont	7	40	9	0	0	0	0	0	0	0	0	0
Massachusetts	113	285	158	0	0	0	9	3	0	0	0	0
Rhode Island	29	4	12	0	0	0	0	0	0	0	0	0
Connecticut	31	107	72	0	0	2	0	1	0	0	0	0
MIDDLE ATLANTIC												
New York	294	581	466	0	2	43	0	0	1	0	0	0
New Jersey	135	186	188	0	0	0	7	0	0	0	0	0
Pennsylvania	164	305	315	1	0	4	0	0	0	0	0	0
EAST NORTH CENTRAL												
Ohio	142	180	180	0	0	0	0	1	0	0	0	0
Indiana	55	28	28	0	0	0	0	2	0	0	0	0
Illinois	150	198	200	0	1	1	0	1	0	0	0	0
Michigan [2]	157	263	205	0	0	1	0	0	0	0	0	0
Wisconsin	153	199	199	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	38	54	52	0	2	0	0	0	0	0	0	0
Iowa	61	17	17	0	0	0	0	0	0	0	0	0
Missouri	26	5	22	0	0	0	0	0	0	0	0	0
North Dakota	5	10	13	0	0	0	0	0	0	0	0	0
South Dakota	10	5	5	0	0	0	0	0	0	0	0	0
Nebraska	15	7	7	0	0	0	0	0	0	0	0	0
Kansas	31	67	49	0	0	1	0	1	0	0	0	1
SOUTH ATLANTIC												
Delaware	1	8	9	0	0	0	0	0	0	0	0	0
Maryland [2]	74	116	48	0	0	0	1	2	0	0	0	0
District of Columbia	7	19	11	0	0	0	0	0	0	0	0	0
Virginia	59	36	44	0	0	0	43	0	0	1	2	2
West Virginia	22	25	25	0	0	0	0	0	0	0	0	0
North Carolina	193	60	107	0	0	0	0	0	0	0	0	6
South Carolina	53	31	32	0	0	1	0	0	0	0	1	2
Georgia	10	16	15	0	0	2	0	0	0	0	0	35
Florida	7	11	11	0	1	0	0	0	0	0	0	7
EAST SOUTH CENTRAL												
Kentucky	88	78	58	0	0	0	1	0	0	1	2	0
Tennessee	23	43	43	0	0	0	2	0	0	0	0	2
Alabama	26	13	13	0	0	0	0	0	0	0	0	25
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	2
WEST SOUTH CENTRAL												
Arkansas	49	7	11	0	3	1	0	0	0	0	0	0
Louisiana	2	0	4	0	3	1	0	0	0	0	0	8
Oklahoma	0	15	10	0	0	0	0	0	0	0	0	0
Texas	93	162	77	0	24	574	0	0	0	0	0	20
MOUNTAIN												
Montana	9	16	16	0	0	0	0	0	0	0	0	0
Idaho	4	5	5	0	0	0	0	0	0	0	0	0
Wyoming	3	4	1	0	0	0	0	0	0	0	1	0
Colorado	53	23	38	0	0	0	0	0	0	0	0	0
New Mexico	2	27	20	0	0	4	1	0	0	0	0	0
Arizona	36	1	3	0	0	0	17	0	0	0	0	0
Utah [2]	21	18	25	0	0	0	0	0	0	0	0	0
Nevada	13	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	73	11	57	0	2	0	0	0	0	0	0	0
Oregon	17	18	18	0	0	0	0	0	0	0	0	0
California	104	235	164	0	3	13	0	2	1	0	0	1
Total	2,675	3,600	3,600	1	41	648	81	13	2	2	6	11
46 weeks	164,249	159,129	159,129	61	1,897	15,276	3,981	623	27	432	707	3,931
46 weeks, 1942	------	------	------	72	1,067	11,370	6,114	522	43	450	772	3,292

[1] New York City only. [2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 3; New York, 2; South Carolina, 1; Florida, 2; Arkansas, 1; Louisiana, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended November 6, 1943

This table lists the reports from 85 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	8	1	6	0	3	0	0	2
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	4	0	------	0	2	5	12	0	32	0	0	16
Fall River	0	0	------	0	0	0	3	2	3	0	0	8
Springfield	0	0	------	0	1	0	1	0	5	0	0	9
Worcester	0	0	------	0	1	0	5	0	20	0	0	1
Rhode Island:												
Providence	0	0	------	0	20	0	3	2	5	0	0	31
Connecticut:												
Bridgeport	0	0	------	0	0	0	5	0	5	0	2	2
Hartford	0	0	------	0	0	0	0	0	3	0	0	7
New Haven	0	0	------	0	0	2	2	0	1	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	1	0	0	7	2	4	0	0	11
New York	8	0	4	3	84	24	54	4	107	0	2	56
Rochester	0	0	------	0	1	1	4	0	4	0	0	6
Syracuse	0	0	------	0	0	0	1	1	2	0	0	9
New Jersey:												
Camden	2	0	------	0	0	2	3	0	2	0	0	1
Newark	0	0	------	0	4	2	4	0	5	0	0	14
Pennsylvania:												
Philadelphia	1	0	3	2	5	5	23	0	37	0	0	31
Pittsburgh	5	2	1	1	75	2	19	1	14	0	0	5
Reading	0	0	------	0	1	0	0	0	1	0	0	4
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0	------	0	5	2	2	0	17	0	0	6
Cleveland	0	0	3	1	1	3	5	0	32	0	0	32
Columbus	1	0	1	1	7	0	0	0	13	0	0	10
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	1	0	0	0
Indianapolis	5	0	------	2	1	0	4	0	11	0	0	5
South Bend	0	0	------	0	16	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	2	0	0	0
Illinois:												
Chicago	3	0	1	2	2	11	17	9	28	0	0	42
Michigan:												
Detroit	1	0	1	0	7	12	16	1	36	0	2	33
Flint	0	0	------	0	3	0	0	0	4	0	0	10
Grand Rapids	0	0	------	0	5	0	2	0	5	0	0	4
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	3	0	0	0
Milwaukee	0	0	------	0	1	0	1	0	45	0	0	51
Racine	0	0	------	0	0	0	0	0	8	0	0	12
Superior	0	0	------	0	232	0	0	0	0	0	0	15
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	8	0	2	0	5	0	0	10
Minneapolis	7	0	------	1	13	1	4	1	20	0	0	3
St. Paul	1	0	------	0	32	0	4	0	16	0	0	20
Missouri:												
Kansas City	1	0	------	0	3	0	4	0	19	0	0	2
St. Joseph	0	0	------	0	0	0	0	0	0	0	0	0
St. Louis	0	0	------	1	2	0	6	1	4	0	0	3

City reports for week ended November 6, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	1	0		0	0	0	2	1	8	0	0	0
Kansas:												
Topeka	0	0		0	3	1	0	0	1	0	0	18
Wichita	0	0		0	1	0	1	1	1	0	0	1
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0		0	7	0	4	0	1	0	0	0
Maryland:												
Baltimore	3	0	1	1	7	6	13	0	17	0	0	25
Cumberland	0	0		0	0	0	0	0	0	0	0	0
Frederick	0	0		0	0	0	0	0	0	0	0	2
District of Columbia:												
Washington	0	0		0	5	2	6	0	9	0	0	6
Virginia:												
Lynchburg	0	0		0	150	0	2	0	1	0	0	23
Richmond	0	0	1	0	16	0	2	0	2	0	0	1
Roanoke	0	0		0	1	0	0	0	0	0	0	6
West Virginia:												
Charleston	0	0		0	2	0	0	0	7	0	0	0
Wheeling	0	0		0	0	0	3	0	0	0	0	0
North Carolina:												
Winston-Salem	3	0		0	2	0	2	0	2	0	0	0
South Carolina:												
Charleston	0	0	8	0	0	2	0	0	2	0	0	0
Georgia:												
Atlanta	3	0	12	0	0	0	0	0	2	0	1	0
Brunswick	0	0	0	0	0	0	0	0	0	0	0	0
Savannah	0	0		0	0	1	0	0	1	0	0	0
Florida:												
Tampa	0	0		0	1	0	1	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	1	0	0	0	2	0	7	0	0	8
Nashville	0	0		0	0	1	2	0	2	0	0	2
Alabama:												
Birmingham	0	0	2	0	4	0	4	0	5	0	0	0
Mobile	2	0		2	0	0	6	0	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0		0	0	0	2	0	0	0	0	0
Louisiana:												
New Orleans	1	0	2	2	1	1	5	2	4	0	1	1
Shreveport	0	0		0	0	0	5	0	1	0	1	0
Texas:												
Dallas	4	0		0	0	1	2	0	4	0	0	0
Galveston	0	0		0	0	0	1	0	2	0	0	0
Houston	1	0		0	0	1	3	0	3	0	8	0
San Antonio	2	0	1	0	0	0	7	4	1	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0		0	0	0	1	0	0	0	0	[illegible]
Great Falls	0	0		0	18	0	1	0	1	0	0	[illegible]
Helena	0	0		0	0	0	0	0	0	0	0	[illegible]
Missoula	0	0		0	0	0	1	0	1	0	0	[illegible]
Idaho:												
Boise	0	0		0	0	0	0	0	0	0	0	[illegible]
Colorado:												
Denver	2	0	11	0	2	1	5	1	7	0	0	1[illegible]
Pueblo	0	0		0	19	0	2	1	2	0	0	[illegible]
Utah:												
Salt Lake City	0	0		0	2	0	1	2	3	0	0	[illegible]

City reports for week ended November 6, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	3	0	------	1	4	0	3	5	3	0	0	14
Spokane	0	0	------	0	4	0	5	0	18	0	1	3
Tacoma	0	0	------	0	3	1	0	0	5	0	0	0
California:												
Los Angeles	12	0	5	2	8	3	4	10	8	0	0	8
Sacramento	2	0	2	2	0	0	0	0	0	0	0	1
San Francisco	1	0	1	0	0	0	6	4	9	0	0	11
Total	82	2	61	25	800	94	325	55	663	0	13	622
Corresponding week, 1942	79	2	90	25	471	28	329	24	718	1	12	959
Average, 1938-42	115	------	86	[1] 20	[2] 476	------	[1] 312	------	642	2	28	1086

Anthrax.—Cases: Camden, 1; Philadelphia, 1.
Dysentery, amebic.—Cases: Boston, 2; Rochester, 1; Atlanta, 1.
Dysentery, bacillary.—Cases: New Haven, 1; Buffalo, 1; New York, 14; Syracuse, 1; Chicago, 2; Baltimore, 7; Charleston, S. C., 14; Los Angeles, 8.
Dysentery, unspecified.—Cases: Baltimore, 2; Richmond, 1; San Antonio, 9.
Typhus fever.—Cases: Savannah, 1; Nashville, 2; Birmingham, 5; New Orleans, 8; Dallas, 2; Houston, 1.

[1] 3-year average, 1940-42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 85 cities in the preceding table (estimated population, 1942, 34,447,100)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza Case rates	Influenza Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
New England	9.9	0.0	0.0	0.0	79.5	19.9	94.4	9.9	191.3	0.0	5.0	101
Middle Atlantic	7.2	0.9	3.6	3.2	76.7	16.2	51.9	3.6	79.4	0.0	0.9	62
East North Central	7.1	0.0	3.5	3.5	164.9	16.5	28.3	5.9	120.7	0.0	1.2	130
West North Central	19.8	0.0	0.0	4.0	122.6	4.0	45.5	7.9	146.4	0.0	0.0	113
South Atlantic	15.6	0.0	38.2	1.7	331.4	19.1	57.3	0.0	76.4	0.0	1.7	109
East South Central	17.8	0.0	17.8	11.9	23.8	5.9	83.2	0.0	89.1	0.0	0.0	59
West South Central	23.5	0.0	8.8	5.9	2.9	8.8	73.3	17.6	44.0	0.0	14.7	3
Mountain	16.1	0.0	88.4	0.0	329.6	8.0	88.4	32.2	112.6	0.0	0.0	161
Pacific	31.5	0.0	14.0	8.7	33.2	7.0	31.5	33.2	75.2	0.0	1.7	65
Total	12.4	0.3	9.2	3.8	121.1	14.2	49.2	8.3	100.4	0.0	2.0	94

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on October 25, 1943, in Makawao area, Island of Maui, T. H., has been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 23, 1943.—During the week ended October 23, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		1		151	147	39	45	16	65	464
Diphtheria		18	4	15		6	1			44
Dysentery (bacillary)				4		1				5
Encephalitis, infectious							2			2
German measles				5	11		1	4	29	50
Influenza			6		4				11	21
Measles		3		178	101	23	3	6	28	342
Meningitis, meningococcus		1	1	2	5	1			1	11
Mumps		21		25	94	17	4	15	34	210
Poliomyelitis		2		10	5	1				18
Scarlet fever		5	14		74	33	18	22	36	202
Tuberculosis (all forms)		8	4	67	48	19		13	52	206
Typhoid and paratyphoid fever				11				1	1	13
Undulant fever					2	1				3
Whooping cough		7		97	89	21	69	28	18	329

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended April 3, 1943, and July 3, 1943.—During the 13 weeks ended April 3, 1943, and July 3, 1943, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	13 weeks ended—		Disease	13 weeks ended—	
	April 3, 1943	July 3, 1943		April 3, 1943	July 3, 1943
Cerebrospinal fever	1,268	906	Puerperal pyrexia	2,191	2,087
Diphtheria	10,434	8,104	Scarlet fever	26,712	23,759
Dysentery	1,328	1,655	Typhoid and paratyphoid fever	170	195
Measles	221,454	127,669	Whooping cough	23,043	27,343
Ophthalmia neonatorum	1,155	1,183			
Pneumonia	18,258	10,263			

England and Wales—Vital statistics—Quarters ended March 31, 1943, and June 30, 1943.—The following table shows the numbers of

births and deaths with rates per 1,000 population in England and Wales for the first and second quarters of 1943, and are provisional:

	Quarter ended—			
	March 31, 1943		June 30, 1943	
	Number	Rate per 1,000 population	Number	Rate per 1,000 population
Live births	171,819	16.8	180,691	17.5
Stillbirths	5,782	.57	5,556	.54
Deaths, all causes	137,568	13.5	113,234	11.0
Deaths under 1 year of age	9,914	[1] 60	8,028	[1] 46

[1] Per 1,000 live births.

MARTINIQUE

Fort de France—Influenza.—Information dated November 8, 1943, states that an epidemic of influenza which causes facial paralysis is current in Fort de France, Martinique.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-August 1943	September 1943	October 1943—week ended—				
				2	9	16	23	30
ASIA								
Ceylon	C	50						
China: Kwangsi Province	C	[1] 1,100						
India	C	185,268	24,898	6,062	8,112			
Bombay	C	14	2	1	11			
Calcutta	C	3,910	1,118	289	293	287		
Chittagong	C	233	12	2	13			
Cochin	C	189	3					
Madras	C	988	15		1	26	12	
Negapatam	C	21						
Vizagapatam	C	61	2					
India (French)	C	55						
Chandernagor	C	8						
Karikal	C	30						
Pondichery	C	17						

[1] Cases reported up to September 8, 1943, with a mortality rate of over 25 percent.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		January–August 1943	September 1943	October 1943—week ended—				
				2	9	16	23	30
AFRICA								
Basutoland	C	[1] 23						
Belgian Congo	D						[2] 7	
Plague-infected rats		P						
British East Africa:								
Kenya	C	14	1					
Uganda	C	18						
Egypt	C	6	8					
Port Said	C	6						
Madagascar	C	40						
Morocco (French)	C	238	3				1	
Senegal	C	240						
Dakar	C	31	1					
Union of South Africa	C	60	5					
ASIA								
India	C	2,336	1,078	209	272			
Indochina	C	23	6		1			
Palestine	C	12						
SOUTH AMERICA								
Peru:								
Lambayeque Department	C	2						
Libertad Department	C	15	1					
Lima Department	C	9	2					
Lima	C	1						
Plague-infected rats		P						
Piura Department	C	2						
Venezuela	C	10						
OCEANIA								
Hawaii Territory:								
Hamakua District	D	5						
Plague-infected rats		[3] 73					1	

[1] Includes 12 pneumonic cases in a village south of Mafeteng.
[2] Suspected pneumonic plague.
[3] Includes 4 plague-infected mice.

SMALLPOX

[C indicates cases; D, deaths]

AFRICA								
Algeria	C	950	137					
Angola	C	594						
Basutoland	C	81						
Belgian Congo	C	2,407	568	172	147	116		
British East Africa:								
Kenya	C	1,044	444	73	77	164		
Mombasa	C	3						
Tanganyika	C	24	3	3				
Uganda	C				15	5		
Dahomey	C	141						
Egypt	C	2,269	579					
French Guinea	C	326	10		1			
Gold Coast	C	16						
Ivory Coast	C	144			10			
Mauritania	C	14	13		13			
Morocco (French)	C	814	34					
Mozambique	C	1						
Nigeria	C	4,467	193	45	42	106		
Niger Territory	C	192	29		39			
Senegal	C	68	6					
Sierra Leone	C	3						
Sudan (French)	C	3,400	40		46			
Union of South Africa	C	345	1					
ASIA								
Arabia	C	1						
Ceylon	C	40	23	11	5			
India	C	31,555	2,873	456	742			
India (French)	C	10						
Indochina	C	4,117	202		73			
Iran	C	502						
Iraq	C	195						
Palestine	C	101		2		1		
Syria and Lebanon	C	942	45		5	7		
Trans-Jordan	C	18						

SMALLPOX—Continued

[C indicates cases; D, deaths]

Place		January-August 1943	September 1943	October 1943—week ended— 2	9	16	23	30
EUROPE								
Belgium	C	1						
France	C	2						
Germany	C	1						
Gibraltar	C	1						
Portugal	C	40				1		
Scotland	C	1						
Spain	C	204						
Switzerland	C	11						
Turkey	C	7,637	257					
NORTH AMERICA								
Canada	C	6						
Guatemala	C	26	1					
Mexico	C	283	22			1		
SOUTH AMERICA								
Brazil	C	43	1			3		
British Guiana	C	1						
Colombia	C	265	16					
Ecuador	C	13	3			1		
Peru	D	12						
Venezuela	C	78	13					[1] 4

[1] For the month of October 1943.

TYPHUS FEVER

[C indicates cases; D, deaths]

Place		January-August 1943	September 1943	October 1943—week ended— 2	9	16	23	30
AFRICA								
Algeria	C	8,040	72					
Basutoland	C		5					
Belgian Congo	C	20				19		
British East Africa:								
Kenya	C	1		1				
Mombasa	C	1						
Uganda	C	1						
Egypt	C	39,274	308					
Gold Coast	C	9						
Morocco (French)	C	13,489	63					
Morocco (Spanish)	C	369						
Nigeria	C	9		1				
Rhodesia, northern	C	8	2					
Senegal	C	2						
Dakar	C	15			1		3	
Sierra Leone	C	3						
Tunisia	C	206	26					
Union of South Africa	C	1,078	5	1				
ASIA								
Afghanistan	C	520						
China: Shanghai	C	12						
India	C	1,063	3					
Iran	C	9,153						
Iraq	C	1,421		1				
Palestine	C	240	26	1	15	1	13	
Syria and Lebanon	C	79	2					
Trans-Jordan	C	15						
EUROPE								
Bulgaria	C	1,698						
France—Seine Department	C	2						
Germany	C	[1] 978						
Hungary	C	716	21	7	12	21		
Irish Free State	C	19						
Netherlands	C	1						
Portugal	C	8	1					
Rumania	C	6,853	107					[2] 141
Slovakia	C	420	32	27	27	6		
Spain	C	557	1					
Turkey	C	3,879	48					

[1] For the period Jan. 1 to Apr. 30, 1943.
[2] For the month of October 1943.

TYPHUS FEVER—Continued

[C indicates cases; D, deaths]

Place		January-August 1943	September 1943	October 1943—week ended— 2	9	16	23	30
NORTH AMERICA								
Cuba	C		1					
Guatemala	C	823	144					
Jamaica	C	16	8			1	3	
Mexico	C	848	54	3	1			
SOUTH AMERICA								
Brazil	C	1						
Chile	C	183	21	2	3			
Colombia	D	1						
Ecuador	C	247	17					[3] 42
Peru	C	12						
Venezuela	C	12	1					
OCEANIA								
Australia	C	81	7	5		1		
Hawaii Territory	C	11						

[3] For the month of October 1943.

YELLOW FEVER

[C indicates cases; D, deaths]

AFRICA								
Belgian Congo:								
Bondo	D	2						
Kinzao	D	1						
Leopoldville	C	2						
Stanleyville	D	1						
Yanonge	C	1						
Dahomey:								
Djougou District	C		[1] 2					
Natitingou	C	[1] 1						
French Guinea:								
Baccoro	D							[1] 1
Conakry	D							[1] 1
Matak Island.[2]								
Gold Coast: Asuboi	C		1					
Senegal:								
Kolda	C		1					
Tambacounda	D							1
SOUTH AMERICA								
Brazil: Para State	D	1						
Colombia:								
Cundinamarca Department	D	3						
Intendencia of Meta	D	2						

[1] Suspected.
[2] On Nov. 4, 1943, 1 death from suspected yellow fever was reported at Matak Island near Conakry, French Guinea.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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U.S. PUBLIC HEALTH SERVICE

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THE DETECTION AND ANALYSIS OF ARSENIC IN WATER CONTAMINATED WITH CHEMICAL WARFARE AGENTS[1]

By C. C. Ruchhoft, *Principal Chemist*, O. R. Placak, *Assistant Chemist*, and Stuart Schott, *Assistant Chemist, United States Public Health Service*

Arsenical contamination is one of the possible dangers to water supplies in surprise attacks of modern chemical warfare. For this reason waterworks chemists should become familiar with reliable methods of determining arsenic and be prepared to detect immediately dangerous contamination of public supplies and prevent their use. Unfortunately chemical warfare arsenicals in the form in which they would be discharged into water supplies cannot readily be determined quantitatively by ordinary methods. The organic arsenicals must be decomposed and oxidized to be determined quantitatively in the low but toxic concentration that is likely to occur. This memorandum has been prepared to familiarize waterworks chemists with the possibilities and assist them to meet the problem of arsenic contamination if and when it occurs.

Some of the more important arsenical compounds which if used in chemical warfare may contaminate water supplies (*1*, *2*, *3*) include the following:

Chemical	Solubility, mg. per liter 20° C.	Formula	Chemical warfare symbol
1. Methyldichlorarsine	1,000 [1]	CH_3AsCl_2	MD
2. Ethyldichlorarsine	1,000 [1]	$C_2H_5AsCl_2$	ED
3. Lewisite-B chlorovinyldichlorarsine	500 [1]	$ClCH{:}\ CHAsCl_2$	M1
4. Phenyldichlorarsine	Insoluble [1]	$C_6H_5AsCl_2$	
5. Diphenylchlorarsine	14.4 [2]	$(C_6H_5)_2AsCl$	DA
6. Adamsite phenylarsazine chloride	15.7 [2]	$NH(C_6H_4)_2AsCl$	DM
7. Diphenylcyanoarsine	Sparingly soluble [1]	$(C_6H_5)_2AsCN$	CDA
8. Diphenylaminocyanoarsine	(?)	$NH(C_6H_4)_2AsCN$	

[1] Reference (*1*).
[2] Determined in this laboratory.

[1] From the Stream Pollution Investigations Station (Cincinnati, Ohio), of the Division of Public Health Methods, National Institute of Health.

The first three compounds above represent the aliphatic arsines and are all vesicants. There are a number of similar compounds, including dimethylbromoarsine, dimethylfluorarsine, methyldicyanoarsine, and ethyldibromoarsine that have been found to be inferior to methyldichlorarsine in aggressive properties. These are not likely to be encountered, although 45 percent of ethyldibromoarsine was used in a mixture with ethyldichlorarsine in the first world war.

Lewisite seems to be the most important representative of a group of compounds which includes dichlorovinylchlorarsine, trichlorovinylarsine, B bromovinyldibromoarsine, B chlorostyrildichlorarsine, B chlorovinylmethylchlorarsine, and phenyl B chlorovinylchlorarsine. Although these compounds also are vesicants, their aggressive properties are less well known and none of them seem as likely to be used as lewisite.

The three representative vesicant aliphatic arsenicals are all sufficiently soluble in water to be extremely dangerous because of systemic poisoning.

Besides, all three are rapidly hydrolyzed, and the soluble arsenic concentrations may thereby be increased according to the following equations:

$$CH_3AsCl_2 + H_2O \rightarrow \quad 2HCl + CH_3AsO$$
$$C_2H_5AsCl_2 + H_2O \rightarrow \quad 2HCl + C_2H_5AsO$$
$$ClCH:CHAsCl_2 + H_2O \rightarrow \quad 2HCl + ClCH:CHAsO \text{ (M1 oxide)}$$

The arsenic hydrolysis products of the first two are soluble in water. The M1 oxide (chlorovinyl arsenious oxide) resulting from the hydrolysis of lewisite is usually referred to as sparingly soluble. This oxide, which is also a vesicant, is precipitated by the rapid hydrolysis of lewisite, after which it readily goes into solution and was found by us to be soluble to the extent of about 12,400 p. p. m. at 20°C. Appearance and odor of the water containing any of these three materials cannot be depended upon to indicate toxic contamination, consequently analysis for arsenic must be made if the water is suspected. Possible change in pH of the water should be watched, as such change might indicate contamination by one of these more soluble arsenicals and should immediately be followed by examination for arsenic.

Compounds Nos. 4 to 8 in the table represent the more important aromatic arsines. Of these the phenyldichlorarsine, a liquid, is a lung injurant and also has vesicant properties, but it is less aggressive than methyldichlorarsine. The last four compounds are all sternutators or toxic smokes and are used as aerosols. The aromatic arsines are all much less soluble in water than the aliphatic compounds. However, diphenylchlorarsine and adamsite, though usually considered insoluble, were found to be sufficiently soluble to produce

toxic waters when saturated. These arsenicals hydrolyze in a similar way to the aliphatic arsines, but at a lower rate, to give the corresponding arsenious oxides and HCl. Additional aromatic arsines that may be mentioned include phenyldibromoarsine, diphenylbromoarsine, and the phenarsazine bromide, iodide, and fluoride that have toxic properties similar to adamsite.

The identification of the arsenical used to contaminate a water is unimportant for immediately safeguarding public supplies. The important action is to determine if and to what extent arsenic is present in the water supply after an attack.

The United States Public Health Service Drinking Water Standards (*4*) states that arsenic in excess of 0.05 p. p. m. should not be permitted in water for drinking or culinary purposes. It is suggested, however, that in emergencies where other supplies are not available arsenic in concentrations up to 1 to 2 p. p. m. might be permitted for several days and concentrations as high as 5.0 p. p. m. might even be permitted for one day.

Assuming a water consumption of 2 liters per day (this is 2.12 quarts and is probably high) 4 mg. of arsenic would be ingested daily through use of a water containing 2 p. p. m. arsenic and 10 mg. would be ingested in one day from the water containing 5 p. p. m. arsenic. This amount is not excessive. Arsenic trioxide is administered internally in doses of 0.001 to 0.003 gm. three or four times a day (*5*, *6*). This corresponds to 3 to 9.1 mg. of arsenic per day and is essentially the same as would be obtained by using the contaminated waters previously mentioned.

The Department of Agriculture's standard of tolerance for arsenic in foodstuffs is 1.4 p. p. m. and for spray residues is 3.58 p. p. m. (*3*).

McNally (*7*) states that the commonly accepted figure for a fatal dose of arsenic is 175 to 204 mg.

The use of contaminated water should not be continued for more than a few days, however, as small quantities of arsenic consumed daily for extended periods of time have been known to produce fatalities (*8*).

PREPARATION OF SAMPLE

Perhaps the most important step in the determination of arsenic present in a water contaminated with organic arsines is the preparation of the sample. As stated before, it is necessary to decompose the arsenicals and oxidize the arsenic before making the determination by the methods that are most easily applied to waters containing small but toxic concentrations of these agents. Several methods of preparing the sample were studied, using samples contaminated with some of the more important arsenicals listed in the first table. It was

found that the treatment of the sample with chlorine to satisfy the immediate (5 to 10 minute) chlorine demand permitted only qualitative detection of arsenic. Permanganate treatment of the sample in the cold was more effective than chlorination. Such oxidation permitted about 50 percent recovery of arsenic from most agents but was still very ineffective on methyldichlorarsine, in which case only about 5 percent of the arsenic present was indicated. Acid digestion of the sample, which unfortunately is time-consuming, was the only procedure which permitted quantitative recovery of the arsenic from all agents that were tried. Acid permanganate treatment of the sample in a hot water bath for 30 minutes permitted quantitative recovery of arsenic from diphenylchlorarsine, adamsite, and lewisite but not from ethyldichlorarsine or methyldichlorarsine. In the case of ethyldichlorarsine about 50 percent recovery of the arsenic was obtained after hot permanganate treatment, and in samples contaminated with methyldichlorarsine only about 25 percent recovery of the arsenic was obtained after this procedure. The acid digestion procedure is therefore recommended as best and the acid permanganate treatment at boiling temperature for 30 minutes as permissible where a rapid field procedure is desired for preparation of the sample. Both procedures are described here.

ANALYTICAL PROCEDURE

The two procedures studied for the determination of arsenic in water supplies are the Gutzeit and the molybdenum blue method. Although the Gutzeit procedure has been standard in the methods of the Association of Official Agricultural Chemists for many years, we prefer and recommend the molybdenum blue method. The Gutzeit procedure is placed last because it is more time-consuming and because our experience confirms published opinions that it cannot be relied upon for accurate quantitative interpretation by the average analyst.

However, the molybdenum blue method is subject to interference by silicon and phosphorus. In our experience 200 p. p. m. or more of silicon are necessary to give interference. As this quantity of silicon is very unusual in water, silicon interference will be rare. Phosphorus interference, however, will not be so unusual. It is not uncommon for polluted waters to contain sufficient phosphates (0.2 to 1.0 p. p. m.) to interfere with the arsenic determination. We have also encountered an unpolluted deep well supply containing 1.6 p. p. m. of PO_4, which prevented the direct application of the molybdenum blue procedure. It would seem desirable for all chemists charged with the protection of water supplies to try the molybdenum blue method and determine beforehand whether this rapid and satisfactory procedure

is applicable to their supplies. If the procedure is not directly applicable after preparation of the sample, the Gutzeit procedure can still be avoided by distilling the arsenic from a Gutzeit generator and catching it in a trap for later application of the molybdenum blue method.

Chemists who have had considerable experience with the Gutzeit method may prefer to continue its use. The method is perfectly reliable in experienced hands when all of the precautions are observed. It can be applied to a sample prepared by complete acid digestion or treated with hot acid permanganate for 30 minutes with equal success for most arsenicals. However, if a light yellow stain rather than the dark brown stain is obtained with the Gutzeit method it indicates incomplete digestion of the sample if organic arsenic is present.

The recommended procedures in order of preference are as follows:

A. Preparation of sample:
- (1) Acid digestion.
- (2) Treatment with acid permanganate in a boiling water bath for 30 minutes.

B. Analysis of prepared sample by:
- (1) Direct molybdenum blue procedure (in absence of PO_4).
- (2) Gutzeit generation followed by molybdenum blue method on arsine distillate.
- (3) Gutzeit procedure.

DETAILED LABORATORY INSTRUCTIONS

PREPARATION OF WATER SAMPLE

A. 1. Acid digestion procedure.

1.1 *Reagents.*

1.11 sulfuric acid—C. P. Analytical reagent

1.12 nitric acid—C. P. Analytical reagent.

1.2 *Procedure.*

To a 50 to 100 ml. water sample in a 500 ml. Kjeldahl flask add 10 ml. of C. P. sulfuric acid, 1 ml. of C. P. nitric acid, and a small piece of ignited pumice. If a red or purple color develops upon the addition of nitric acid, adamsite is indicated. Similarly a purple color will develop in the hot acid permanganate digestion if adamsite is present. This color formation is due to diphenylamine always present as an impurity in the adamsite.

Mix by shaking and digest under a hood until fumes of sulfuric acid are given off. After cooling, 50 ml. of distilled water are added and the digestion is continued until sulfuric acid fumes are again obtained. Cool and add 10 ml. of water and transfer to a 50 ml. or 100

ml. volumetric flask. Rinse the Kjeldahl flask with water and add to the volumetric flask, making the sample up to 50 ml. or 100 ml. Proceed to the analysis by one of the following procedures adjusting the acidity if the molybdenum blue method is to be used.

A. 2. Hot acid permanganate oxidation. (Does not give quantitative results on MD and ED.)

2.1 *Reagents.*

2.11 Dilute sulfuric acid. Prepared by adding one volume of concentrated analytical reagent acid to three volumes of distilled water.

2.12 Potassium permanganate solution. Dissolve 0.4 gm. of C. P. potassium permanganate in 1 liter of distilled water.

2.13 Ammonium oxalate solution. Dissolve 1.0 gm. of C. P. ammonium oxalate in 1 liter of distilled water.

2.2 *Procedure.*

To a 20 ml. water sample in a large test tube or small Erlenmeyer flask add 2.5 ml. of dilute sulfuric acid and an excess of potassium permanganate solution; usually ½ to 1 ml. will be sufficient. The sample is then immersed in boiling water for 30 minutes. This may be easily accomplished by placing the tubes in a wire basket, which is then placed in the bath. If the permanganate color of the samples fades, additional permanganate is added. At the end of the oxidation period the excess permanganate may be destroyed by ammonium oxalate solution in increments of 1/10 ml. followed by an interval of a minute after each addition. If only a small excess of permanganate remains, its destruction is unnecessary. The contents of the tubes may then be washed into comparison tubes if the molybdenum blue procedure is to be used, or transferred to the Gutzeit generator. Further adjustment of the acidity is unnecessary for the molybdenum blue method if this oxidation was carried out as described.

ANALYTICAL PROCEDURES

B. 1. Direct molybdenum blue method.

1.1 *Reagents.*

1.11 Standard arsenious oxide solution. Dissolve exactly 0.3301 gm. of arsenic trioxide (reagent grade) in 25 ml. of 10 percent sodium hydroxide solution, make the solution slightly acid with sulfuric acid (1:6), and dilute to 1 liter. One milliliter of this stock standard solution contains 0.25 mg. of arsenic.

The above stock solution is diluted 1 to 5, as needed, to prepare a solution of proper strength for preparing the color standards. In using the direct molybdenum blue pro-

cedure it is convenient to prepare this dilute standard solution with its arsenic oxidized. To 20 ml. of the stock standard arsenious oxide solution in a small Erlenmeyer flask add 10 ml. of sodium hypobromite solution (same strength as given under B.2), mix, and hold for a few minutes. Then add 2 ml. of dilute sulfuric acid (2.11), boil until the color of bromine disappears, cool, and dilute to 100 ml. One ml. of the dilute standard is equivalent to 0.05 mg. of oxidized arsenic.

1.12 Ammonium molybdate solution. Dissolve 25 gm. ammonium molybdate in 300 ml. water. Dilute 75 ml. of concentrated sulfuric acid to 200 ml. with water and add to the ammonium molybdate solution.

1.13 Stock stannous chloride solution. Dissolve 40 gm. C. P. arsenic free $SnCl_2.2H_2O$ in 100 ml. of concentrated HCl.

1.14 Diluting hydrochloric acid solution. Add 40 ml. concentrated HCl to 1 liter of water.

1.15 Dilute stannous chloride solution. Take 10 ml. of solution 1.13 and add 150 ml. of solution 1.14. Prepare a fresh dilute stannous chloride solution every 2 weeks from 1.13 and 1.14.

1.16 Hydrazine sulfate solution, half saturated (alternate reagent for the dilute stannous chloride). Shake excess hydrazine sulfate with 50 ml. of water until no more dissolves, filter, and dilute with an equal volume of water. For the best results this solution should be prepared fresh each day that it is to be used.

1.2 *Procedure.*

The permanganate treated sample needs no further acid adjustment, but an acid digested sample should be neutralized by adding 25 percent NaOH solution from a burrette using phenolphthalein as an indicator. Transfer the neutralized sample or an aliquot to a Nessler tube (100 ml. long form tubes are preferable) and add 2½ ml. of dilute sulfuric acid (A. 2. 11).[2]

After proper acid adjustment, add 1 ml. of ammonium molybdate solution and mix, then add 1 ml. of stannous chloride (or hydrazine sulfate) solution, mix again, and make up to volume. At the same time prepare a series of arsenic standards with quantities of dilute

[2] The amount of acid present is very important and must be closely controlled. Too much acid inhibits color formation and too little permits the reduction of ammonium molybdate with color formation in the blank. Two and one-half ml. of the dilute sulfuric is the correct amount for a 100 ml. tube and about 2 ml. must be present in a 50 ml. tube. If there is any doubt, add increasing amounts of acid to a series of blanks and by completing the addition of the other reagents determine the minimum amount of acid necessary to inhibit color formation.

standard arsenic solution from 0.1 to 1.0 ml. by adding the dilute acid and other reagents as above and dilute to volume. When stannous chloride is used in the sample and standards as described, the color readings should be made within 5 to 10 minutes. With hydrazine sulfate 30 minutes or longer may be necessary for full color development.

B. 2. Gutzeit generation followed by molybdenum blue method (*9*).

Procedure.[3]

A Gutzeit generator is prepared in the usual way, but in place of the tube containing the mercuric bromide paper, attach a tube

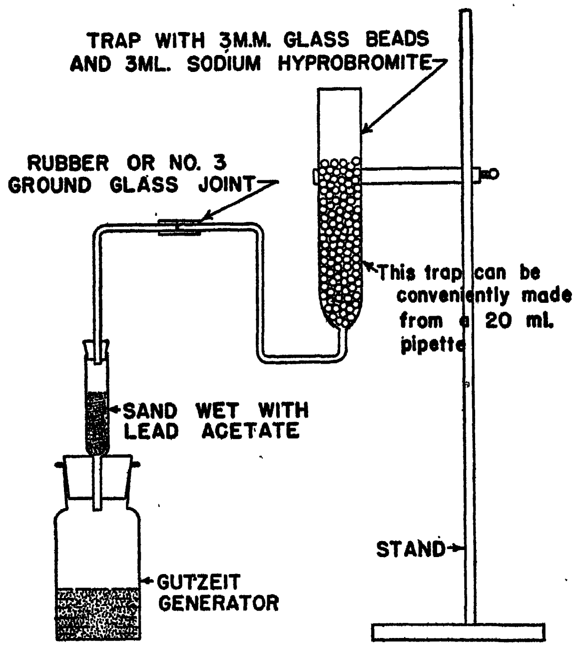

FIGURE 1.—Apparatus for the Gutzeit arsine generation molybdenum blue method.

leading the generated gases to a trapping device containing 3 ml. of sodium hypobromite solution (3 ml. of half saturated bromine water plus 1 ml. 0.5 N NaOH solution) as shown in the accompanying figure. It is better to have two trapping devices in series; the second need contain only water. Treat the arsenic test solution in the same way as in the Gutzeit method.

Allow the generation of arsine to proceed as directed under the Gutzeit method. After generation is complete, transfer the contents of the traps to a graduated colorimeter tube, Nessler tube, or volumetric flask. Wash the trap with six 2 ml. portions of water using an

[3] The Chaney method (J. Ind. and Eng. Chem., Anal. Ed., 12: 691 (1940)) is a modification of the molybdenum blue method which requires a special glass digestor and still. Where this equipment is available the procedure is very satisfactory.

aspirator to blow the wash solution out of the bead traps. Add 2½ ml. of dilute sulfuric acid and continue as directed under B. 1.2 using hydrazine sulfate solution as the reductant.[4]

B. 3. The Gutzeit official AOAC method (*10*).

Reagents.

3.10 Stannous chloride solution. Dissolve 40 gm. of As—free $SnCl_2.2H_2O$ in HCl and make up 100 ml. with same strength acid.

3.11 Zinc. Use 20 to 30 mesh, As—free granulated zinc which needs no preliminary treatment.

3.12 Potassium iodide solution. Dissolve 15 gm. KI in H_2O and dilute to 100 ml.

3.13 Sand. Clean 30 mesh (through 30 but not 40 mesh) white sea sand by washing successively with hot 10 percent NaOH solution, hot concentrated HNO_3, and hot distilled H_2O. Dry the clean sand.

3.14 Mercuric bromide paper. Use commercial arsenic papers cut from paper of uniform weight and texture into strips exactly 2.5 mm. wide and about 12 cm. long. (Uniformity in width and texture of paper is of great importance in this comparison method. Irregular texture produces irregular impregnation, with consequent inaccurate results.) To sensitize, soak strips 1 hour or longer in 3 to 6 percent (optimum 5 percent) solution of filtered $HgBr_2$ in alcohol, according to quantity, character, and activity of zinc used. (Attenuated, unsatisfactory stains, due to over-rapid evolution of arsine, can be shortened and intensified by increasing concentrations of $HgBr_2$ and vice versa.) If the strips are in sheets, cut off two sides before soaking and leave strips attached at ends. After sensitization remove strips and dry individual ones on glass and groups by waving in the air. Place strips when nearly dry between clean sheets of paper and subject them to pressure long enough to take out bends and curls. Store in dry, dark place. (Aging of paper usually results in markedly fainter and longer stains. Desirable types of stains result from use of impregnated strips not over 2 days old.) When ready to use, cut individual strips off squarely ½ inch from one end and insert this end in the narrow tube of the apparatus. Handle sheets by the paper attached to either end and cut

[4] If stannous chloride is to be used as a reductant the hypobromite must be destroyed first. This may be done by transferring the solution and washings from the trap to a small Erlenmeyer flask and, after acidifying, boiling for a few minutes until all bromine is removed. The cooled solution may be transferred to a Nessler tube and the procedure continued as usual. As the destruction of hypobromite is not necessary with hydrazine sulfate this reductant is more convenient to use following the arsine generation procedure.

in half just before use. Strips must be clean and free from any contamination.

3.15 Standard arsenic solution. Dissolve 1 gm. As_2O_3 in 25 ml. 20 percent NaOH. Saturate solution with CO_2 and dilute to 1 liter with recently boiled distilled water. One ml. of this solution contains 1 mg. As_2O_3. Dilute 40 ml. of this solution to 1 liter. Make 50 ml. of the diluted solution to 1 liter and use to prepare standard stains. A solution containing 0.001 mg. As_2O_3 may also be prepared. Prepare fresh dilute solution at frequent intervals.

Apparatus.

3.20 Generators and absorption tubes. Use 2 oz. wide-mouthed bottles of uniform capacity and design as generators and fit each by means of perforated stoppers with a glass tube 1 cm. in diameter and 6 to 7 cm. long, with an additional constricted end to facilitate connection. Place small wad of glass wool in constricted bottom end of tube and add 3.5 to 4 gm. of the 30 mesh cleaned sand, taking care to have the same quantity in each tube. Moisten sand with 10 percent Pb acetate solution and remove excess by light suction. Clean sand when necessary by treatment (do not remove sand from tube) with HNO_3 followed by H_2O rinse and suction. Treat with Pb acetate solution. If sand has dried through disuse, clean, and remoisten it as directed. Connect tube by means of rubber stoppers with narrow glass tube 2.6 to 2.7 mm. in internal diameter and 10 to 12 cm. long, and introduce the clean end of the strip of $HgBr_2$ paper. (A 3 mm. bore allows the paper to curl, which results in an uneven stain and poor end point.) Clean and dry tube before inserting bromide paper. (An ordinary pipe cleaner may be used.)

3.21 Water bath. Use any constant temperature water bath. If no water bath is available, use any flat-bottomed container of suitable depth and capacity. (A deep water bath is suggested to insure uniform conditions during evolution and absorption of arsine.)

3.30 *Determinations.*

3.31 Determine the acid by titration in a definite aliquot of the digested sample solution. Place aliquot containing 0.01 mg. to 0.03 mg. As_2O_3 (0.020 to 0.025 mg. is optimum) and not larger than 30 ml. in Gutzeit generator. If arsenic in aliquot taken is outside limits specified, repeat with proper aliquot. On the basis of the acidity titration,

neutralize the sulfuric acid in the aliquot with a 25 percent solution of sodium hydroxide, cool, and add exactly 5 ml. of concentrated HCl. Cool when necessary and add 5.0 ml. KI reagent and 4 drops of the $SnCl_2$. Prepare standards corresponding to 0.01, 0.02, and 0.03 mg. As_2O_3 from reagent (3.15). Since standards must contain same kind and amounts of acid as samples, add 5 ml. of HCl, and, as H_2SO_4 has been neutralized, add an equivalent quantity As—free Na_2SO_4 to standards. Mix and allow to stand 30 minutes at not less than 25° C. or 5 minutes at 90° C. Dilute with H_2O to 40 ml.

3.32 Prepare generator as directed under 2 and center strip of $HgBr_2$ paper carefully in narrow tube. According to activity of zinc, add 2 to 5 gm. granulated zinc adding same quantity to each generator.

3.33 Immerse the apparatus within 1 inch of top of narrow tube in water bath (constant temperature of 20° to 25° C.), allow evolution to proceed 1.5 hours. Compare strips or prepare graph from standard strips.

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SMALLPOX IN RELATION TO STATE VACCINATION LAWS AND REGULATIONS

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Although smallpox has been on the wane in the United States in recent years, the fact that cases are still occurring annually in many States is ample evidence that the infection is being actively maintained in this country. The prevention of the disease assumes greater im-

portance during the war emergency, because of the necessity of eliminating every possible hindrance to the war effort. The movement of population, especially the migration of susceptible workers to the centers of war industry, provides an excellent opportunity for the development of epidemics.

It is obvious to all health authorities, or should be so, that the amount of smallpox in a State or community is determined largely by their vaccination requirements and procedures and the effectiveness with which their requirements are applied. In this country, these measures, and apparently the incidence of smallpox in the States, are dependent upon the popular vote. In a previous study of smallpox in a group of 20 States during the period 1915–20,[1] the incidence of the disease was shown to be closely related to the status of vaccination requirements in the respective States, as revealed by the then existing laws and regulations and correspondence with the State health officers.

During the period covered by that report, the increasing incidence of smallpox in the United States was marked and definite. In 1920 a total of more than 96,000 cases was reported in 34 States, with 508 deaths, while in 1921 a total of more than 103,000 cases was reported in the same States, with 641 deaths. The incidence of smallpox in the United States has decreased sharply since 1931, especially during 1940, 1941, and 1942, when only 2,795, 1,368, and 864 cases, respectively, were reported. There still remains, however, a significant inverse correlation between the incidence of the disease and the rigorousness of the provisions of law or regulations regarding vaccination. This correlation is especially marked when the incidence rates are compared by States grouped according to the positiveness of their vaccination requirements.

The correlation presented here is based on the numbers of cases of smallpox reported by the States to the Public Health Service for the 4 years 1938–41, inclusive,[2] and the provisions of law and regulation regarding smallpox vaccination, especially with reference to directive, permissive, and prohibitory provisions.[3] No attempt was made to secure information regarding the actual practice in States with authorizing or permissive provisions. Even the thoroughness with which directive provisions are carried out may vary greatly between different States or between different parts of the same State. For this reason the correlation between smallpox incidence and the actual extent of vaccination of school children may be even more exact than the correlation here presented.

[1] Force, John N., and Leake, James P.: Smallpox in twenty States, 1915–20. Pub. Health Rep., 36: 1979–1989 (Aug. 19, 1921). (Reprint No. 687.)

[2] Years which include the 1940 Census population enumeration and for which, therefore, the population estimates for intercensal years are most nearly accurate.

[3] Fowler, William: Principal provisions of smallpox vaccination laws and regulations in the United States. Pub. Health Rep., 56: 167–189 (Jan. 31, 1941). (Reprint No. 2227.)

The rates are computed on the total numbers of smallpox cases reported to the United States Public Health Service by the State departments of health during the 4-year period 1938–41 and the aggregate populations for those years. The enumerated populations of the 1940 Census were used for that year, and the figures for the other years are Bureau of the Census estimates based on the 1930–40 arithmetical intercensal changes. These rates are for the total period, and, consequently, if applied to the respective total annual populations, they give the total cases actually reported during the period.

As the most important vaccination provisions relate to the vaccination of children as a prerequisite to school attendance, varying types of these provisions (directive, permissive, and prohibitive) form the basis of the group classifications used here. It is impracticable to group the States according to vaccination requirements under such simple and unqualified headings as "those which require vaccination" and "those which do not require vaccination" because of the variation in the requirements of the various State laws and regulations. Some States have unqualified directive provisions, others have directive requirements under certain conditions, and still others have permissive or discretionary provisions.

The States have been grouped in the following six classifications with respect to smallpox vaccination requirements:

1. States in which vaccination is a prerequisite to school attendance, regardless of the presence or absence of smallpox.
2. States in which vaccination of pupils may be required at all times.
3. States having various permissive provisions regarding smallpox vaccination.
4. States having varying provisions which direct or authorize the exclusion of unvaccinated persons from school only when smallpox is present or threatened.
5. States for which no important provisions of law or regulations were found regarding vaccination.
6. States having various prohibitive provisions.

It will be noted that some States are included in two groups because of overlapping provisions. For example, Minnesota is found in both group 4 and group 6. While a Minnesota regulation requires successful vaccination of employees in State institutions who come in contact with wards of such institutions, and a statute provides that the State board of health may control assembling, during smallpox epidemics, with other persons not vaccinated, there is also a statutory provision which prohibits requiring the vaccination of a child, or exclusion, except during smallpox epidemics, of a child from public schools because the child is not vaccinated. For similar reasons it was found necessary to include a few other States in two groups. This, however, does not invalidate the correlations between vaccination requirements and smallpox incidence in the groups as the same factor is included in each group.

The various persons referred to in the laws and regulations include, among others, "pupils," "child," "children," "pupils and teachers," "pupils, teachers, and employees," and "pupils and persons"; and among the various schools mentioned are included "public schools," "public and private schools," "public, private, parochial, and other schools," "any school in the State" (South Carolina), and "schools in cities having 50,000 or more inhabitants" (New York).

Vaccination is a prerequisite to school attendance, regardless of the presence or absence of smallpox, in 12 States and the District of Columbia; 5 States have statutes empowering school authorities to make vaccination a condition precedent to school attendance, and the statute of 1 State (Ohio) authorizes regulations by district boards of education to secure the vaccination of pupils, under which statute a regulation requiring vaccination has been upheld by the courts. Ten States have various permissive provisions regarding vaccination; they pertain to such matters as free vaccination, vaccination officers or physicians, records and reports, vaccination certificates, and the preparation, procuring, distribution, sale, storage, use, etc., of vaccine. There are 12 States which have varying provisions requiring or authorizing the exclusion of unvaccinated persons from school only when smallpox is present or threatened; 6 of these States require exclusion, while 6 have provisions authorizing exclusion under the circumstances mentioned. There are 9 States for which no important provisions of law or regulation were found relating to vaccination. Seven States have various prohibitive provisions.

The following table presents the smallpox incidence rates during the years 1938–41 by groups of States classified by vaccination requirements provided by law or regulation:

TABLE 1.—*Average smallpox case rates, 1938–41*

Group and States included	Annual case rate per 100,000 population
1. States (13, including the District of Columbia) requiring vaccination of pupils as a prerequisite to school attendance, regardless of the presence or absence of smallpox (Arkansas, Kentucky, Maryland, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, South Carolina, Virginia, West Virginia, District of Columbia)	0.8
2. States (6) in which vaccination of pupils may be required at all times (Connecticut, Georgia, Maine, New Jersey, Ohio, Oregon)	3.0
3. States (10) having various permissive provisions regarding vaccination (Alabama, Colorado, Connecticut, Georgia, Kansas, Michigan, Mississippi, North Carolina, Tennessee, Wyoming)	3.6
4. States (12) having varying provisions which direct or authorize the exclusion of unvaccinated persons from school only when smallpox is present or threatened (Arizona, Iowa, Kansas, Louisiana, Minnesota, Montana, Nebraska, New York, North Carolina, Oregon, Texas, Wisconsin)	6.3
5. States (9) which have no important laws or regulations promoting or efficacious in achieving the application of vaccination of the population (Delaware, Florida, Idaho, Illinois, Indiana, Missouri, Nevada, Oklahoma, and Vermont)	11.1
6. States (7) having various prohibitive provisions regarding the requirement of smallpox vaccination (Arizona, California, Minnesota, North Dakota, South Dakota, Utah, Washington)	13.2

If these States are regrouped, combining groups 1, 2, 3, and 4, i. e., those States which have some type of provision requiring, authorizing, or permitting the vaccination of pupils, the rate is 3.4, as compared with 11.1 for those having no important vaccination provisions, and with 13.2 for States having some type of prohibitive provision.

Included in group 5 are two States, Delaware and Vermont, which are in areas that include States having the most effective vaccination provisions. Such contiguity is probably of great importance. They are the only States in group 5 reporting no cases of smallpox during the 4-year period.

Without knowledge of the actual vaccination procedures which obtain in those States which require or authorize the exclusion of pupils only when smallpox is present or threatened (group 4), and in those which have varying permissive provisions (group 3), no explanation can be offered for the lower rate in group 3 other than to assume a more regular application of preventive measures in this group.

It has been suggested that, aside from legal requirements, public health education is a factor in the reduction of smallpox, and that a high incidence of the disease stimulates education and promotes widespread vaccination, which is followed by a decline in incidence. It was pointed out that, in 1939, seven of the Mountain and Pacific States reported 1,530 cases, with case rates ranging from 3.1 per 100,000 population in Utah to 29.1 in Colorado, whereas, in marked contrast, there were only 152 cases in these States during the first 9 months of 1940, with case rates ranging from 0 in Colorado to 2.3 in Oregon.[4]

The total smallpox incidence rates for all 11 of the Mountain and Pacific States in 1939, 1940, and 1941 were 13.1, 3.5, and 1.2 per 100,000 population, respectively. The percentage decreases in the numbers of smallpox cases in these States in 1940 and 1941, as compared with 1939, were 73 and 90 percent, respectively. It may be pointed out, however, that during this period there was a similar decline in smallpox incidence for the country as a whole from 9,877 cases in 1939 to 2,795 in 1940 and 1,368 in 1941. These figures represent a decrease of 72 percent in 1940 and of 86 in 1941 as compared with 1939.

With all due regard for the need and effectiveness of general popular health education in the control of disease, and for the stimulative effect of a high incidence of smallpox in promoting a temporary interest in vaccination in a State or community, it would appear that the best method of control of the disease is some type of directive law or regulation which requires the vaccination of children as a prerequisite to school attendance, regardless of the presence or absence of

[4] Dr. William P. Shepard in the American Journal of Public Health, January 1941, page 86.

smallpox. This provides for a continuing protective procedure and prevents the building up, intermittently, of a large reservoir of susceptibles.

CONCLUSION

The difference in the incidence of smallpox in the different areas of the United States is apparently related to the various provisions of law or regulation, especially with reference to the requirement of vaccination as a prerequisite to school attendance, the permitting of discretionary powers to local authorities, and prohibitive provisions. As was stated in a previous report, it is apparent that smallpox is lowest in those jurisdictions which have some type of universal routine vaccination requirements.

TABLE 2.—*States in which vaccination is a prerequisite to school attendance, regardless of the presence or absence of smallpox (group 1)*

State	Number of cases, 1938-41	Total years of life, 1938-41	Annual case rate per 100,000 population
Arkansas	498	7,784,009	6.4
Kentucky	615	11,351,198	5.4
Maryland	0	7,259,714	—
Massachusetts	0	17,283,164	—
New Hampshire	0	1,962,395	—
New Mexico	104	2,113,268	4.9
New York	51	53,793,637	.1
Pennsylvania	1	39,558,563	.003
Rhode Island	0	2,843,785	—
South Carolina	27	7,577,465	.4
Virginia	10	10,676,823	.1
West Virginia	45	7,584,679	.6
District of Columbia	0	2,629,793	—
Total	1,351	172,418,493	.8

TABLE 3.—*States in which vaccination of pupils may be required at all times (group 2)*

State	Number of cases, 1938-41	Total years of life, 1938-41	Annual case rate per 100,000 population
Connecticut	6	6,822,709	0.1
Georgia	108	12,465,315	.9
Maine	0	3,381,951	—
New Jersey	0	16,622,214	—
Ohio	1,023	27,591,879	3.7
Oregon	987	4,340,827	22.7
Total	2,124	71,224,895	3.0

TABLE 4.—*States having various permissive provisions regarding smallpox vaccination (group 3)*

State	Number of cases, 1938–41	Total years of life, 1938–41	Annual case rate per 100,000 population
Alabama	161	11,306,077	1.4
Colorado	841	4,481,287	18.8
Connecticut	6	6,822,709	.1
Georgia	102	12,465,315	.8
Kansas	764	7,216,633	10.6
Michigan	835	20,881,709	4.0
Mississippi	176	8,711,571	2.0
North Carolina	60	14,233,294	.4
Tennessee	517	11,623,475	4.4
Wyoming	89	999,608	8.9
Total	3,551	98,741,678	3.6

TABLE 5.—*States having varying provisions requiring or authorizing the exclusion of unvaccinated persons from school only when smallpox is present or threatened (group 4)*

State	Number of cases, 1938–41	Total years of life, 1938–41	Annual case rate per 100,000 population
Arizona	466	1,988,661	23.4
Iowa	2,753	10,142,462	27.1
Kansas	764	7,216,633	10.6
Louisiana	56	9,420,729	.6
Minnesota	1,896	11,138,273	17.0
Montana	381	2,234,610	17.0
Nebraska	462	5,276,467	8.8
New York	51	53,793,637	.1
North Carolina	60	14,233,294	.4
Oregon	987	4,340,827	22.7
Texas	1,306	25,580,068	5.1
Wisconsin	719	12,522,836	5.7
Total	9,901	157,888,497	6.3

TABLE 6.—*States for which no important provisions in law or regulations were found regarding vaccination (group 5)*

State	Number of cases, 1938–41	Total years of life, 1938–41	Annual case rate per 100,000 population
Delaware	0	1,062,278	—
Florida	28	7,516,682	0.4
Idaho	689	2,089,071	33.0
Illinois	1,610	31,548,828	5.1
Indiana	3,152	13,684,579	23.0
Missouri	1,954	15,115,984	12.9
Nevada	6	433,498	1.4
Oklahoma	1,719	9,356,385	18.4
Vermont	0	1,436,483	—
Total	9,158	82,248,788	11.1

TABLE 7.—*States having various prohibitive provisions regarding the requirement of smallpox vaccination (group 6)*

State	Number of cases, 1938–41	Total years of life, 1938–41	Annual case rate per 100,000 population
Arizona	466	1, 988, 661	23. 4
California	2, 094	27, 470, 006	7. 6
Minnesota	1, 896	11, 138, 273	17. 0
North Dakota	597	2, 576, 293	23. 2
South Dakota	1, 026	2, 588, 177	39. 6
Utah	62	2, 195, 462	2. 8
Washington	1, 097	6, 921, 688	15. 8
Total	7, 238	54, 878, 560	13, 2

INCIDENCE OF HOSPITALIZATION, OCTOBER 1943

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country mostly in large cities.

Item	October	
	1942	1943
1. Number of plans supplying data	61	65
2. Number of persons eligible for hospital care	9, 057, 776	10, 473, 984
3. Number of persons admitted for hospital care	81, 908	89, 070
4. Incidence per 1,000 persons, annual rate, during current month (daily rate× 365)	106. 4	100. 1
5. Incidence per 1,000 persons, annual rate for the 12 months ended October 1943	107. 8	105. 0

DEATHS DURING WEEK ENDED NOVEMBER 20, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 20, 1943	Corresponding week, 1942
Data for 89 large cities of the United States:		
Total deaths	8, 888	9, 136
Average for 3 prior years	8, 515	
Total deaths, first 46 weeks of year	412, 318	384, 588
Deaths under 1 year of age	617	594
Average for 3 prior years	542	
Deaths under 1 year of age, first 46 weeks of year	29, 458	26, 562
Data from industrial insurance companies:		
Policies in force	66, 046, 335	65, 252, 281
Number of death claims	11, 418	12, 092
Death claims per 1,000 policies in force, annual rate	9. 0	9. 7
Death claims per 1,000 policies first 46 weeks of year, annual rate	9. 7	9. 1

COURT DECISION ON PUBLIC HEALTH

Swine—keeping for feeding on swill, etc., brought from without town where animals are kept.—(Rhode Island Supreme Court; *Kane et al.* v. *Lapre*, 33 A.2d 218; decided July 15, 1943.) A statute of Rhode Island forbade the keeping in any town of swine "to be fed on swill, offal or other decaying substances, brought from any other town, except in such place therein as shall be designated by the town council thereof." The members of a town council, in their collective official capacity as such town council, brought a bill in equity to enjoin the respondent from keeping swine in the town in violation of such statute.

One of the points decided by the State supreme court, on an appeal by the respondent from a decree of the lower court granting an injunction, related to the proper construction to be given to the statute. The construction contended for by the respondent was that the law required the town council first to designate a place in the town where such business could be located before it could enforce the prohibition. The appellate court's view, however, was that the law prohibited the keeping in any town of swine to be fed on swill brought from any other town unless and until the town council designated a place for such purpose but that the council could not arbitrarily refuse to so designate, upon application, a particular place in such town.

The respondent admitted that he was keeping swine in the town to be fed on swill brought from without and that the place where he was keeping them had not been designated by the town council but contended that, because he had been continuously keeping swine in such manner without interruption for over 10 years, the town council was chargeable with laches in seeking to interfere with his business at this late day and argued also that the town council's inaction constituted an implied license to him to continue to conduct his business in his customary manner as though his place had been designated by the council. The court pointed out that obviously the respondent could not prove an implied license by acquiescence of the town council because he not only had never received any permission to conduct his business at a particular location but had been expressly denied such permission on two occasions when he had applied therefor in 1937. "But regardless of this fact," said the court, "we are of the opinion that the defense of laches is not available to respondent in a proceeding under the statute here involved."

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 27, 1943

Summary

A decline occurred in the incidence of meningococcus meningitis. A total of 195 cases was reported for the current week, as compared with 265 last week, 223 for the next preceding week, and a 5-year (1938–42) median of 35. Decreases were recorded in all of the 9 geographic areas except the West South Central.

While the current incidence remains high as compared with prior years, the total for the week is lower than for either of the past 2 weeks, and, with one exception, lower than for any of the past 6 weeks. The total for the past 4 weeks, 876, is only 23 more than for the preceding 4-week period. The cumulative total for the year to date is 16,256, as compared with 3,196 for the same period last year and a 5-year median of 1,827. The total reported since the beginning of the fourth quarter of the year is 1,792, as compared with a 5-year median of 268.

Of the current total of influenza cases reported, 2,465, as compared with 1,734 for the preceding week and a 5-year median of 1,854, which was also the number reported for the corresponding week last year, 80 percent occurred in 6 States, as follows (last week's figures in parentheses): Minnesota 270 (1), Missouri 149 (3), Virginia 259 (168), South Carolina 331 (295), Texas 807 (716), and Arizona 155 (163).

A total of 150 cases of poliomyelitis was reported for the week, as compared with 221 for the preceding week. The current incidence, however, is above the corresponding 5-year median of 118. The largest numbers of cases were reported in California, 29, Oregon, 17, and New York, 11. Only 6 other States reported more than 6 cases each.

Reports for the week showed increased incidence for only 2 (influenza and measles) of the 9 common communicable diseases included in the following table.

Deaths recorded in 89 large cities of the United States totaled 8,621 for the current week, as compared with 8,888 last week and a 3-year (1940–42) average of 8,413. The accumulated total to date this year is 420,939, as compared with 393,088 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended November 27, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Nov. 27, 1943	Nov. 28, 1942		Nov. 27, 1943	Nov. 28, 1942		Nov. 27, 1943	Nov. 28, 1942		Nov. 27, 1943	Nov. 28, 1942	
NEW ENGLAND												
Maine	4	0	1	31	------	------	70	0	47	0	7	0
New Hampshire	0	0	0	------	2	------	5	48	3	3	1	0
Vermont	1	0	0	------	2	------	23	103	12	0	0	0
Massachusetts	6	0	4	------	------	------	158	285	197	11	4	1
Rhode Island	0	0	1	------	------	------	38	2	2	1	3	0
Connecticut	3	0	0	1	3	3	3	176	60	6	0	0
MIDDLE ATLANTIC												
New York	15	14	14	[1] 3	[1] 9	[1] 7	321	257	257	24	9	5
New Jersey	2	2	6	7	12	6	269	27	15	6	7	1
Pennsylvania	11	9	16	1	4	------	204	407	332	16	6	2
EAST NORTH CENTRAL												
Ohio	8	20	20	12	14	9	1,434	34	28	10	2	1
Indiana	9	5	17	3	3	8	111	13	13	0	1	0
Illinois	9	17	30	6	15	12	40	35	30	10	5	1
Michigan	12	8	12	1	1	1	364	62	62	8	4	1
Wisconsin	3	0	1	19	31	21	328	38	91	5	1	0
WEST NORTH CENTRAL												
Minnesota	17	0	1	270	------	------	352	3	59	5	0	0
Iowa	1	6	6	------	2	2	23	39	33	0	0	0
Missouri	6	9	10	149	3	3	5	7	7	8	1	1
North Dakota	6	6	2	5	------	1	222	1	1	0	0	0
South Dakota	2	11	6	------	------	------	9	14	2	0	0	0
Nebraska	9	5	4	3	------	------	14	81	5	2	0	0
Kansas	7	6	6	5	3	3	7	20	20	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	1	------	------	------	11	1	2	1	0	0
Maryland [2]	11	6	9	6	4	4	16	22	22	12	6	1
District of Columbia	2	1	1	4	1	------	4	2	2	0	3	0
Virginia	13	41	51	259	344	129	372	17	17	6	6	2
West Virginia	3	10	10	5	18	13	20	1	14	3	1	1
North Carolina	24	35	59	7	2	3	55	3	132	0	2	1
South Carolina	4	17	15	331	435	291	27	2	4	2	1	0
Georgia	12	21	21	30	6	16	25	1	5	0	0	1
Florida	8	3	8	7	1	1	17	8	8	2	0	0
EAST SOUTH CENTRAL												
Kentucky	6	10	16	1	3	10	32	18	18	2	2	1
Tennessee	11	9	18	56	15	27	24	11	13	6	0	1
Alabama	21	15	34	54	27	52	62	3	10	1	1	1
Mississippi [2]	11	7	15	------	------	------	------	------	------	4	1	1
WEST SOUTH CENTRAL												
Arkansas	4	15	17	89	60	62	23	7	6	0	2	1
Louisiana	9	4	8	1	3	6	1	1	1	2	0	0
Oklahoma	8	11	13	74	29	47	3	0	2	1	0	0
Texas	37	43	54	807	539	295	27	5	5	7	4	1
MOUNTAIN												
Montana	0	0	2	6	5	6	97	13	16	0	0	0
Idaho	0	0	0	------	------	------	8	15	15	0	1	0
Wyoming	0	0	0	2	96	1	12	15	1	0	1	0
Colorado	3	10	7	12	43	17	80	13	21	1	1	1
New Mexico	2	0	1	4	1	1	1	3	3	1	0	0
Arizona	5	0	4	155	52	87	5	6	6	0	0	0
Utah [2]	0	0	0	------	3	7	2	313	25	2	0	0
Nevada	0	0	0	------	------	------	0	16	0	0	0	0
PACIFIC												
Washington	6	2	2	1	1	------	15	238	48	1	2	0
Oregon	2	1	1	11	26	18	43	202	23	5	0	0
California	42	20	25	27	36	36	70	60	149	29	8	1
Total	375	399	642	2,465	1,854	1,854	5,052	2,648	2,464	195	93	35
47 weeks	12,296	13,851	14,545	98,408	96,491	162,712	566,993	483,286	483,286	16,256	3,196	1,827

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 27, 1943, and comparison with corresponding week of 1942 and 5 year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and para typhoid fever [3]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Nov. 27, 1943	Nov. 28, 1942		Nov. 27, 1943	Nov. 28, 1942		Nov. 27, 1943	Nov. 28, 1942		Nov. 27, 1943	Nov. 28, 1942	
NEW ENGLAND												
Maine	0	0	0	30	8	13	0	0	0	0	0	0
New Hampshire	2	0	0	5	17	7	0	0	0	0	0	0
Vermont	1	0	0	14	3	7	0	0	0	0	1	0
Massachusetts	4	0	0	158	183	119	0	0	0	1	0	1
Rhode Island	0	0	0	7	5	5	0	0	0	0	1	0
Connecticut	8	0	1	51	25	29	0	0	0	2	0	2
MIDDLE ATLANTIC												
New York	11	3	3	257	122	216	0	0	0	9	3	6
New Jersey	1	1	1	63	62	77	0	0	0	0	2	2
Pennsylvania	3	2	7	158	153	210	0	0	0	11	7	9
EAST NORTH CENTRAL												
Ohio	1	1	2	237	367	213	0	1	1	3	3	2
Indiana	0	0	2	55	37	105	0	4	3	1	1	2
Illinois	10	3	3	168	141	242	10	2	2	2	3	3
Michigan	3	1	2	147	104	115	0	1	3	0	2	2
Wisconsin	4	2	3	139	206	145	0	0	2	3	0	0
WEST NORTH CENTRAL												
Minnesota	0	4	8	6	63	70	0	0	6	0	1	0
Iowa	2	1	1	59	56	59	0	0	1	0	0	1
Missouri	1	3	3	58	58	80	0	2	1	0	0	2
North Dakota	1	0	0	13	6	11	0	0	0	0	0	0
South Dakota	0	0	0	23	29	29	0	0	0	0	0	0
Nebraska	1	2	2	27	16	16	0	0	0	0	0	0
Kansas	4	2	2	92	68	89	1	0	0	0	3	3
SOUTH ATLANTIC												
Delaware	0	0	0	3	6	7	0	0	0	0	0	0
Maryland [2]	0	0	0	55	28	34	0	0	0	0	0	2
District of Columbia	0	0	0	21	21	14	0	0	0	1	1	0
Virginia	1	2	2	57	61	61	0	0	0	2	11	6
West Virginia	0	0	0	65	49	68	0	0	0	1	1	4
North Carolina	0	4	2	96	95	89	0	0	0	0	3	2
South Carolina	0	0	0	9	16	14	0	0	0	1	4	1
Georgia	0	0	0	18	40	37	0	0	0	0	1	5
Florida	0	1	0	9	12	7	0	0	0	2	2	1
EAST SOUTH CENTRAL												
Kentucky	2	0	2	69	57	85	0	0	0	6	2	4
Tennessee	2	3	3	64	92	98	0	0	0	4	1	3
Alabama	0	0	1	20	30	35	0	0	0	0	1	2
Mississippi [2]	2	0	0	9	17	17	0	0	0	0	2	2
WEST SOUTH CENTRAL												
Arkansas	0	0	1	1	15	15	0	0	0	1	2	7
Louisiana	1	0	0	7	4	8	0	0	0	5	1	4
Oklahoma	8	0	1	75	17	23	0	0	0	2	0	4
Texas	9	17	1	75	26	68	0	1	1	7	2	6
MOUNTAIN												
Montana	3	2	1	32	14	28	0	1	1	1	0	0
Idaho	0	0	1	27	5	6	0	0	0	0	0	1
Wyoming	0	0	0	2	3	4	0	0	0	0	0	0
Colorado	1	0	1	37	29	28	0	0	0	1	0	2
New Mexico	1	0	0	4	5	7	0	0	0	0	1	1
Arizona	0	0	0	5	4	5	0	0	0	1	1	1
Utah [2]	7	0	0	93	13	12	0	0	0	1	2	1
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	10	0	1	66	29	21	0	0	0	0	1	2
Oregon	17	2	2	43	18	25	0	0	0	2	0	1
California	29	13	5	201	160	160	0	0	1	0	5	5
Total	150	69	118	2,930	2,595	2,642	11	12	26	70	71	127
47 weeks	11,993	3,902	6,911	124,926	113,154	140,753	687	719	2,202	5,155	6,374	9,038

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 27, 1943, and comparison with corresponding week of 1942 and 5 year median—Continued

Division and State	Whooping cough: Week ended— Nov. 27, 1943	Whooping cough: Week ended— Nov. 28, 1942	Whooping cough: Median 1938–42	Week ended Nov. 27, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	3	66	29	0	0	0	0	0	0	0	0	0
New Hampshire	2	9	6	0	0	0	0	0	0	0	0	0
Vermont	31	44	44	0	0	0	0	0	0	0	0	0
Massachusetts	95	205	179	0	0	0	4	0	0	0	0	0
Rhode Island	26	22	18	0	0	0	0	0	0	0	0	0
Connecticut	23	73	77	0	0	1	0	1	0	0	0	0
MIDDLE ATLANTIC												
New York	284	439	465	0	2	19	0	2	0	0	0	0
New Jersey	90	189	189	0	1	0	0	0	0	0	0	0
Pennsylvania	127	344	344	1	0	0	0	1	0	0	1	0
EAST NORTH CENTRAL												
Ohio	133	211	211	0	0	0	1	0	0	0	0	0
Indiana	18	25	26	0	0	0	0	0	0	0	0	0
Illinois	132	163	163	0	0	1	0	0	0	0	1	0
Michigan	222	286	279	0	1	4	0	0	0	0	1	0
Wisconsin	172	215	215	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	41	26	56	0	3	0	0	0	0	0	0	0
Iowa	28	12	20	0	0	0	0	0	0	0	0	0
Missouri	16	13	20	0	0	0	1	0	0	0	0	0
North Dakota	5	5	9	0	0	0	0	0	0	0	0	0
South Dakota	8	3	3	0	0	0	0	0	0	0	1	0
Nebraska	27	2	5	0	0	0	0	0	0	0	0	0
Kansas	39	48	48	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	11	14	14	0	0	0	0	0	0	0	0	0
Maryland [2]	53	82	52	0	0	0	2	0	0	0	0	0
District of Columbia	3	20	12	0	0	0	0	0	0	0	0	0
Virginia	109	37	37	0	0	0	0	0	0	0	3	1
West Virginia	17	26	26	0	0	0	0	1	0	0	0	0
North Carolina	190	77	102	0	0	0	0	0	0	1	0	2
South Carolina	50	31	22	0	0	2	0	0	0	0	0	6
Georgia	4	24	15	0	0	3	0	0	0	0	0	36
Florida	4	9	9	0	3	0	1	0	0	0	0	9
EAST SOUTH CENTRAL												
Kentucky	91	20	41	0	0	0	0	0	0	0	0	0
Tennessee	25	55	27	0	0	0	1	1	0	0	2	4
Alabama	11	17	30	0	0	0	0	0	0	0	0	35
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	1
WEST SOUTH CENTRAL												
Arkansas	8	27	15	0	0	0	0	0	0	0	0	0
Louisiana	7	4	4	0	3	10	0	0	0	1	0	5
Oklahoma	2	5	7	0	0	0	0	0	0	1	0	0
Texas	89	128	41	0	34	468	0	1	0	0	0	34
MOUNTAIN												
Montana	16	16	16	0	0	0	0	0	0	0	0	0
Idaho	3	0	2	0	0	0	0	0	0	0	0	0
Wyoming	1	5	5	0	0	0	0	0	0	0	0	0
Colorado	33	12	12	0	0	0	0	0	0	0	0	0
New Mexico	4	2	3	0	0	5	3	1	0	0	0	0
Arizona	23	4	4	0	0	0	3	0	0	0	0	0
Utah [2]	14	14	20	0	0	0	0	0	0	0	1	0
Nevada	1	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	32	28	28	0	0	0	0	0	0	0	0	0
Oregon	15	2	16	0	0	0	0	0	0	0	0	0
California	117	184	152	0	2	13	0	2	0	0	0	1
Total	2,455	3,243	3,555	1	49	526	16	10	0	3	10	134
47 weeks	166,704	162,372	162,372	62	1,946	15,802	3,997	633	27	435	717	4,065
47 weeks, 1942	------	------	------	73	1,094	11,536	6,155	532	43	451	791	3,355

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: South Carolina, 1; Florida 2.

NOTIFIABLE DISEASES, THIRD QUARTER 1943 [1]

The figures in the following table are the totals of the monthly morbidity reports received from the State health authorities for July, August, and September 1943, and are preliminary and therefore incomplete. The comparisons made are with similar preliminary reports. Each State health officer has been requested to include in the monthly report for his State all diseases that are required by law or regulation *to be reported in the State. The lists of diseases* required to be reported are not the same for each State, although the common communicable diseases are notifiable in all the States. Certain diseases, however, may be a health problem in some States but not in others. There are variations among the States also in the degree of completeness of reporting of cases. As compared with the deaths, incomplete case reports are obvious for such diseases as malaria, pellagra, pneumonia, and tuberculosis, while in many States other diseases, such as puerperal septicemia and Vincent's infection, are not reportable.

In spite of these known deficiencies, however, these monthly reports, which are published quarterly and annually in consolidated form, have proved of value in presenting early information regarding the reported incidence of a large group of diseases and in indicating a trend by providing a comparison with similar preliminary figures for prior years. To some extent they also give a picture of the geographic prevalence of certain diseases, as the States are arranged by geographic location.

Leaders are used in the table to indicate that no case of the disease was reported.

Consolidated monthly State morbidity reports for July, August, and September 1943

Division and State	Anthrax	Chickenpox	Diphtheria	Dysentery, amebic	Dysentery, bacillary	Dysentery, undefined	Encephalitis, infectious	German measles	Hookworm disease	Influenza	Malaria	Measles	Meningitis, meningococcus	Mumps	Ophthalmia neonatorum	Pellagra	Pneumonia, all forms	Poliomyelitis
NEW ENGLAND																		
Maine	------	224	3	------	------	------	2	57	------	2	2	396	30	70	------	------	28	9
New Hampshire	2	7	1	------	------	------	------	98	------	1	------	38	7	17	------	------	------	3
Vermont	------	114	6	------	------	------	------	69	------	------	------	256	6	71	------	------	------	13
Massachusetts	1	635	29	1	39	------	9	600	------	------	40	2,003	153	531	45	------	283	147
Rhode Island	------	34	2	------	------	------	------	9	------	2	1	506	38	35	------	------	15	127
Connecticut	------	242	11	4	102	------	1	173	------	15	8	576	61	293	------	------	339	296
MIDDLE ATLANTIC																		
New York	2	928	61	28	808	------	16	[2] 270	------	[2] 14	21	5,735	332	636	34	------	2,581	424
New Jersey	2	501	18	7	3	------	3	491	------	29	5	3,027	90	1,759	2	------	520	57
Pennsylvania	6	867	95	1	104	------	6	------	------	7	------	1,226	198	1,039	15	------	528	67
EAST NORTH CENTRAL																		
Ohio	------	343	73	1	28	------	2	214	------	35	14	1,269	94	408	149	1	466	117
Indiana	------	69	64	2	14	------	------	44	------	57	88	443	35	103	------	------	182	69
Illinois	------	409	81	7	15	------	21	152	1	62	101	1,902	155	642	113	------	1,262	1,226
Michigan	------	675	39	4	103	------	1	177	------	13	68	4,330	111	562	4	------	394	81
Wisconsin	------	1,049	29	1	------	------	2	647	------	129	18	3,561	40	1,012	------	------	264	103
WEST NORTH CENTRAL																		
Minnesota	------	278	76	19	2	2	3	------	------	8	2	895	19	------	------	------	58	113
Iowa	------	49	51	3	1	------	1	16	------	2	7	297	33	150	------	------	31	145
Missouri	------	43	25	16	------	------	5	------	------	8	60	285	75	87	2	------	152	157
North Dakota	------	48	17	2	------	------	5	------	------	20	1	464	2	74	------	------	157	11
South Dakota	------	20	20	1	2	------	3	------	------	------	2	259	4	35	------	1	14	10
Nebraska	------	35	40	------	------	------	------	------	------	13	1	114	2	136	------	------	9	107
Kansas	------	85	37	1	1	------	11	21	1	16	20	259	21	188	------	------	124	623

SOUTH ATLANTIC																		
Delaware	1	6	5				1			1		32	14	7			2	6
Maryland		78	20	2	44	66	2	67		12	1	368	62	163	1		311	13
District of Columbia		18	5		27					3	4	194	23	105			148	5
Virginia		111	74	2		3, 759				717	66	523	91	311		10	516	26
West Virginia		35	49		6		1			9		222	26	81			5	13
North Carolina		68	251	5	121					57	60	349	73			8	167	21
South Carolina		88	479		256			45	263	1, 752	4, 752	180	37	375	8	221	553	7
Georgia		27	170	9	142	16			917	177	205	171	25	204		14	234	13
Florida		18	42	62	26			14	943	96	44	82	38	148	3	1	383	10
EAST SOUTH CENTRAL																		
Kentucky		10	44	2	69			26		14	43	95	24	44			67	93
Tennessee		30	87	1		119	1	24	3	61	108	181	40	125	7	16	248	8
Alabama		43	115	1			2	34		207	1, 380	317	36	118		19	406	16
Mississippi		399	75	355	4, 597				1, 235	4, 388	10, 978	576	28	755	24	864	1, 493	15
WEST SOUTH CENTRAL																		
Arkansas	1	19	45	37	320		1	29		57	715	127	18	149		21	242	53
Louisiana		9	69	6	114		1	5	14	61	112	85	28	73		3	277	42
Oklahoma	1	17	38		79		1		11	93	550	73	21	107		22	86	429
Texas	1	408	261	437	4, 379		27			3, 368	3, 431	845	56	403	13	251	1, 483	939
MOUNTAIN																		
Montana		121	20			1	2			12	4	459	7	173			[3] 246	18
Idaho		30	1					8		7		82	4	42			19	11
Wyoming		27	5			1	1	14		34		124	4	72			18	11
Colorado		114	65	2	101		10			164	13	188	12	202			215	200
New Mexico		11	11	2	46	51	1	10		7	4	30	3	25		4	98	47
Arizona		21	18	3		376	3	37		443	49	132	18	108	1		245	42
Utah		407					7	89		5	98	257	14	264			319	265
Nevada		22	1		3		1			1	4	64	5	18			23	14
PACIFIC																		
Washington		500	72		2	5	9	200		19		499	34	468			175	159
Oregon		261	51	9			1			29	8	345	33	291			90	139
California		2, 214	195	24	161		112	1, 144		288	743	2, 108	226	2, 938			732	1, 666
1943	17	11, 767	3, 046	1, 057	11, 715	4, 390	275	4, 784	3, 388	12, 515	23, 831	36, 549	2, 506	15, 677	421	1, 456	16, 208	8, 186
1942	22	11, 170	3, 101	713	10, 745	6, 038	186	3, 409	3, 955	10, 223	27, 192	21, 471	660	19, 197	232	1, 564	14, 409	2, 186
Median, 1938-42	18	11, 170	3, 441	885	9, 918	572	452	[4] 3, 126	5, 001	10, 097	34, 272	24, 405	382	10, 243	274	2, 530	13, 081	4, 178
Alaska		34						4		29		215	1	19			21	
Hawaii Territory		95	8	3	18		1	22	14	7, 383	145	20	11	420			31	3
Panama Canal Zone [5]		43	37	11	4						513	15		410			[6] 51	

[1] For reports for first and second quarters of 1943, see PUBLIC HEALTH REPORTS for June 11, 1943, page 928, and October 8, 1943, page 1521.
[2] New York City only.
[3] Includes delayed reports.
[4] 3-year (1940-42) average.
[5] Includes the cities of Colon and Panama.
[6] In the Canal Zone only.

Consolidated monthly State morbidity reports for July, August, and September 1943—Continued

Division and State	Puerperal septicemia	Rabies in animals	Rabies in man	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tuberculosis, all forms	Tuberculosis, respiratory	Tularemia	Typhoid and paratyphoid fever	Paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
NEW ENGLAND																			
Maine					101	4					159	142		7	1		20	24	253
New Hampshire				1	27	1					62			2					18
Vermont					23						52			6			11	6	213
Massachusetts					1,085	20		8	2	5	776	705	2	82	71		14		904
Rhode Island		1			63	3			1		322	314		6	2		3	1	625
Connecticut					175	38		2		1	322	314		13	3		24		304
MIDDLE ATLANTIC																			
New York		22		17	1,017	63		21		5	3,280	3,058	1	103	32	7	91		3,191
New Jersey				12	203	12		5		4	903			40	13		18		1,925
Pennsylvania		1	1	4	577					3	1,151		2	128		1	14		2,692
EAST NORTH CENTRAL																			
Ohio		21	1	8	923	29	2	10			1,644	1,601	2	179	5		29	26	2,365
Indiana			1	5	172	3	4		1		526	412	1	44			21	62	675
Illinois		117		9	550	49	25	15	27		2,520	2,410	7	64	7		111	121	2,242
Michigan					440	86	2	2			1,767			107	60		34	71	3,108
Wisconsin				1	603	3	1				344		3	17		1	50		3,329
WEST NORTH CENTRAL																			
Minnesota					242	8	1	2			561		7	3			107	4	870
Iowa		7		1	213	3	2				121	121		15	4		99		539
Missouri				2	181			4	161		614		6	78			23	10	476
North Dakota				1	35		1		148		88	83	2	10	5		4	15	381
South Dakota				1	81		5	1	2	1	97		1	1			24	1	120
Nebraska					84						39			1			3		182
Kansas		3			336	5		2		1	195	100	4	28	3	2	62	87	601
SOUTH ATLANTIC																			
Delaware				9	15						55	55		2			2		36
Maryland				24	178	15		5			851	826	2	22	1		2	7	1,123
District of Columbia		36			59						668	655		11	1				327
Virginia				42	196	104					943	943	10	93	7	10	14		1,222
West Virginia			1	11	323	3					349		1	77	1	2	3		722
North Carolina				28	505	13					334	327	1	61		27	4		1,902
South Carolina		26		1	69	52		1			197		2	74	15	79	1		1,198
Georgia				2	173	46		22	1		631	631	16	131	21	541	35	86	301
Florida					42	11		9			299			25	4	102	12	76	253
EAST SOUTH CENTRAL																			
Kentucky			2	3	151	21	1		19		617	610	3	137	1		5		474

Tennessee			1	17	217	15	2	9			1,132		23	105	11	22	8	73	616
Alabama		17		4	153		1	13			723		2	71	2	218	19		488
Mississippi	45				75				16		403	395	8	72		54	14		2,903
WEST SOUTH CENTRAL																			
Arkansas		36			45	97	3		168		304	277	17	87		3	1		323
Louisiana		25	1		44	17		3			527	522	2	108	9	93	22		103
Oklahoma				7	176	47	1	1	48		601		9	83		2	6	5	115
Texas					259	25	5		19		1,515		10	211	16	599	135		2,989
MOUNTAIN																			
Montana				4	87	8	2				110		9	8			4	45	286
Idaho				2	301	2					18	11		8	1			1	32
Wyoming				11	93	3			40		29	3	28	4			3	12	43
Colorado		2		2	199	9					362		5	25	2		20		555
New Mexico		4			23	1	2		26		233	208	1	32	5	1			91
Arizona			1		57	25		1	69		383			34	1		6		200
Utah				2	133	2			2		22	21	14	3			5		945
Nevada					16	17			1		19		3				3	74	11
PACIFIC																			
Washington					223	4	1	1			492	477	1	16	1		13	19	736
Oregon				2	123	3	1		1		140		2	13			18	79	590
California		172		1	1,014			14	5	4	2,498	2,377	1	56	15	6	61		2,471
1943	45	490	9	234	12,080	927	62	151	757	24	29,998	17,688	208	2,503	320	1,770	1,187	905	46,158
1942	73	469	2	203	10,429	818	85	135	621	48	26,207	12,874	229	2,951		1,557	903	312	46,231
Median, 1938–42	115	590	10	207	11,559	1,419	269	155	866	52	26,207	14,858	257	4,831		1,122	1,000	430	46,231
Alaska					19						97	26							1
Hawaii Territory					3	6		4	3					3	2	57	2		487
Panama Canal Zone [5]					2						[6] 15	[6] 15		6	4				[6] 3

[5] Includes the cities of Colon and Panama. [6] In the Canal Zone only.

Actinomycosis: Connecticut, 1; Michigan, 1; Minnesota, 5; Kansas, 1; Nevada, 1.
Botulism: California, 2.
Coccidioidomycosis: Arizona, 39; California, 4.
Conjunctivitis: Massachusetts, 82 (suppurative); Connecticut, 3 (infectious), Indiana, 12 (kerato); Illinois, 19 (kerato); Kansas, 2 (pink eye); Michigan, 16 (kerato), 1 (pink eye); Maryland, 13; Georgia, 0; Florida, 2; Oklahoma, 5; New Mexico, 1; Arizona, 4; Nevada, 13; Washington, 1; California, 8 (acute infectious of newborn, ophthalmia neonatorum); Hawaii Territory, 9 (follicular).
Dengue: South Carolina, 1; Florida, 4; Louisiana, 1; Texas, 57; Hawaii Territory, 309.
Diarrhea and enteritis: New Jersey, 2 (diarrhea of newborn); Ohio, 615; Illinois, 2 (diarrhea under 1 year); Michigan, 34 (diarrhea of newborn); Maryland, 126; South Carolina, 6,805 (diarrhea only); Florida, 3 (diarrhea only); New Mexico, 120; Nevada, 38 (diarrhea in children); Washington, 9 (enteritis only); California, 41 (diarrhea of newborn).
Dog bites: Illinois, 4,266 (all animals); Michigan, 2,373.
Food poisoning: Ohio, 3; Illinois, 67; Kansas, 10; Louisiana, 197; Nevada, 17; California, 137.
Granuloma: Ohio, 9 (unspecified); Missouri, 4 (inguinale); Tennessee, 5 (inguinale); Mississippi, 261 (inguinale); Louisiana, 21 (inguinale); Arizona, 5 (inguinale); Washington, 4 (inguinale).

Impetigo contagiosa: Ohio, 111; Indiana, 3; Illinois, 21; Michigan, 214; North Dakota, 4; Kansas, 33; Oklahoma, 4; Montana, 10; Washington, 20; Oregon, 114; Hawaii Territory, 32.
Jaundice: Indiana, 1; Illinois, 2 (hemorrhagic); Minnesota, 30; Florida, 9; California, 17.
Leprosy: Illinois, 1; Louisiana, 3; Texas, 2; Hawaii Territory, 7; Panama Canal Zone, 3.
Lymphogranuloma venereum: Maine, 1; Missouri, 7; Tennessee, 40; Louisiana, 60; Utah, 1.
Plague (human): California, 1; Hawaii Territory, 1.
Psittacosis: Ohio, 1.
Rat-bite fever: Minnesota, 1.
Relapsing fever: Kansas, 2; Texas, 18; Nevada, 7; Panama Canal Zone, 1.
Rheumatic fever: Illinois, 66; Michigan, 13; Missouri, 5; Georgia, 17; Idaho, 14; Wyoming, 4; Arizona, 13; Utah, 3; California, 144.
Silicosis: Ohio, 7; New Mexico, 2.
Tick paralysis: South Carolina, 1.
Weil's disease: Massachusetts, 1; Michigan, 9; Louisiana, 1; Hawaii Territory, 12.

WEEKLY REPORTS FROM CITIES

City reports for week ended November 13, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	2	0	3	0	4	0	0	5
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	1	0	0	[illegible]
Vermont:												
Barre	0	0	------	0	0	0	0	0	6	0	0	[illegible]
Massachusetts:												
Boston	2	0	------	0	2	6	9	6	37	0	1	18
Fall River	0	0	------	0	0	0	0	0	3	0	0	4
Springfield	0	0	------	0	1	1	1	0	17	0	0	5
Worcester	0	0	------	0	0	2	10	0	36	0	0	10
Rhode Island:												
Providence	0	0	------	0	54	0	0	0	7	0	0	22
Connecticut:												
Bridgeport	0	1	------	0	0	0	0	0	6	0	0	1
Hartford	0	0	------	0	0	2	1	0	0	0	0	[illegible]
New Haven	0	1	------	0	0	0	1	0	1	0	0	[illegible]
MIDDLE ATLANTIC												
New York:												
Buffalo	1	0	------	0	4	1	1	1	4	0	0	[illegible]
New York	12	3	3	3	128	21	61	7	96	0	2	[illegible]
Rochester	0	0	------	0	2	1	6	0	6	0	0	[illegible]
Syracuse	0	0	------	0	0	1	4	1	5	0	0	[illegible]
New Jersey:												
Camden	1	0	------	0	0	2	1	0	0	0	0	[illegible]
Newark	0	0	3	0	8	1	5	0	4	0	0	[illegible]
Trenton	0	0	1	1	0	1	2	1	4	0	0	[illegible]
Pennsylvania:												
Philadelphia	0	0	2	1	8	9	17	0	23	0	0	[illegible]
Pittsburgh	4	0	5	6	91	3	11	0	19	0	0	[illegible]
Reading	0	0	------	0	6	0	2	0	0	0	0	[illegible]
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	6	0	------	0	23	1	1	0	23	0	0	[illegible]
Cleveland	0	0	1	0	5	1	9	0	54	0	0	[illegible]
Columbus	0	0	1	1	9	0	4	0	10	0	0	[illegible]
Indiana:												
Fort Wayne	3	0	------	0	1	0	0	0	0	0	0	[illegible]
Indianapolis	0	0	------	0	2	1	10	0	19	0	0	[illegible]
South Bend	0	0	------	0	12	1	0	0	0	0	0	[illegible]
Terre Haute	0	0	------	0	0	0	3	0	0	0	0	[illegible]
Illinois:												
Chicago	2	0	2	2	8	7	21	14	23	0	0	[illegible]
Springfield	0	0	------	0	0	0	0	0	2	0	0	[illegible]
Michigan:												
Detroit	2	0	------	0	5	16	18	2	37	0	2	5
Flint	0	0	------	0	0	0	0	0	3	0	0	
Grand Rapids	0	0	------	1	3	0	1	0	10	1	0	
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	1	0	0	
Milwaukee	0	0	1	1	4	1	0	1	29	0	0	4
Racine	0	0	------	0	0	0	0	0	2	0	0	1
Superior	0	0	------	0	115	0	0	0	0	0	0	

City reports for week ended November 13, 1943

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	9	0	1	0	10	0	0	14
Minneapolis	5	0	------	0	25	1	2	0	20	0	0	2
St. Paul	2	0	------	0	42	1	4	1	6	0	0	26
Missouri:												
Kansas City	0	0	------	0	1	0	2	1	16	0	0	4
St. Joseph	0	0	------	0	0	1	0	0	4	0	0	0
St. Louis	0	0	3	0	1	8	8	2	5	0	1	6
Nebraska:												
Omaha	3	0	------	0	1	0	2	2	14	0	0	0
Kansas:												
Topeka	0	0	------	0	2	0	1	0	3	0	0	4
Wichita	0	0	------	0	2	0	5	0	3	0	0	2
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	2	6	2	6	0	1	0	0	0
Maryland:												
Baltimore	1	0	1	0	5	3	9	0	11	0	0	27
Cumberland	0	0	1	1	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	2	1	11	2	10	0	15	0	1	15
Virginia:												
Lynchburg	0	0	------	0	170	0	0	0	1	0	0	12
Richmond	1	0	------	0	1	2	2	0	5	0	0	3
Roanoke	0	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	3	0	0	0	5	0	0	0
Wheeling	0	0	------	0	0	0	2	0	0	0	0	2
North Carolina:												
Winston-Salem	2	0	------	0	1	0	0	0	2	0	0	4
South Carolina:												
Charleston	0	0	13	1	0	0	3	0	0	0	0	0
Georgia:												
Atlanta	0	0	9	0	0	0	2	0	4	0	0	0
Brunswick	0	0	------	0	2	0	1	0	0	0	0	0
Savannah	0	0	------	0	0	2	0	0	0	0	0	0
Florida:												
Tampa	2	0	------	0	0	1	3	0	2	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	1	0	0	0	2	0	5	0	0	3
Nashville	0	0	------	1	0	0	1	0	1	0	0	0
Alabama:												
Birmingham	2	0	------	1	3	0	3	0	4	0	0	4
Mobile	1	0	------	1	0	1	3	0	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	2	0	0	0	0	7
Louisiana:												
New Orleans	3	0	------	0	0	1	4	0	8	0	2	1
Texas:												
Dallas	1	0	------	0	0	0	2	0	2	0	1	0
Galveston	0	0	------	0	0	0	0	0	0	0	0	0
Houston	3	0	------	0	0	1	7	1	0	0	0	0
San Antonio	2	0	------	0	0	0	2	1	0	0	0	2

City reports for week ended November 13, 1943

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
MOUNTAIN												
Montana:												
Billings	1	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	32	0	1	0	4	0	0	0
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	1	0	0	0	0	0
Idaho:												
Boise	1	0	------	0	1	0	0	0	2	0	0	0
Colorado:												
Denver	12	0	8	0	2	0	7	2	7	0	0	27
Pueblo	0	0	------	0	40	0	0	2	3	0	0	0
Utah:												
Salt Lake City	0	0	------	0	0	0	0	0	5	0	0	1
PACIFIC												
Washington:												
Seattle	8	0	------	0	5	2	7	1	2	0	0	24
Spokane	1	0	------	0	9	0	2	0	15	0	0	4
Tacoma	2	0	------	0	0	1	1	1	6	0	0	4
California:												
Los Angeles	8	0	10	1	7	2	2	8	24	0	0	7
Sacramento	0	0	------	0	1	0	1	2	0	0	0	0
San Francisco	1	0	1	0	0	3	3	14	25	0	0	8
Total	95	5	68	25	875	113	316	71	733	1	10	727
Corresponding week, 1942	87	3	92	27	481	31	354	9	712	0	11	971
Average, 1938–42	112	------	95	[1] 23	[2] 558	------	[1] 336	------	686	2	27	1,106

Dysentery, amebic.—Cases: Boston, 2; New York, 1; Camden, 1; Los Angeles, 1; San Francisco, 1.
Dysentery, bacillary.—Cases: Buffalo, 1; New York, 143; Chicago, 1; Detroit, 1; Baltimore, 1; Charleston, S. C., 1; Los Angeles, 2.
Dysentery, unspecified.—Cases: Camden, 5; Richmond, 1; San Antonio, 6.
Tularemia.—Cases: Chicago, 1.
Typhus fever.—Cases: New York, 1; Philadelphia, 1; Winston-Salem, 1; Savannah, 4; Tampa, 3; Birmingham, 3; Little Rock, 1; New Orleans, 10; Houston, 1; San Antonio, 1.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,546,000)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	5.0	5.0	0.0	0.0	146.6	27.3	62.1	14.9	293.2	0.0	2.5	181
Middle Atlantic	8.0	1.3	6.2	4.9	110.2	17.8	49.1	4.5	71.8	0.0	0.9	78
East North Central	7.6	0.0	2.9	2.9	109.2	16.4	39.1	9.9	124.4	0.6	1.2	155
West North Central	19.8	0.0	5.9	0.0	164.2	21.8	49.4	11.9	160.2	0.0	2.0	115
South Atlantic	10.4	0.0	45.1	8.7	345.3	20.8	65.9	0.0	79.8	0.0	1.7	109
East South Central	17.8	0.0	5.9	17.8	17.8	5.9	53.5	0.0	65.3	0.0	0.0	42
West South Central	28.0	0.0	0.0	0.0	0.0	6.2	52.9	6.2	31.1	0.0	9.3	31
Mountain	112.6	0.0	64.3	0.0	602.9	0.0	72.4	32.2	168.8	0.0	0.0	225
Pacific	35.0	0.0	19.2	1.7	38.4	14.0	28.0	45.4	125.8	0.0	0.0	82
Total	14.3	0.8	10.3	3.8	132.1	17.1	47.7	10.7	110.6	0.2	1.5	110

FOREIGN REPORTS

ALGERIA

Infectious diseases—May–August 1943.—During the months of May, June, July, and August 1943, cases of certain infectious diseases were reported in Algeria as follows:

Disease	May	June	July	August
Cerebrospinal meningitis	8	5	1	1
Diphtheria	24	23	29	32
Dysentery	4	12	8	15
Erysipelas		2		1
Leprosy		2		
Measles	39	74	13	36
Poliomyelitis	1		1	1
Recurrent fever	2	11		3
Scarlet fever	11	16	3	7
Smallpox	56	148	107	117
Tuberculosis (respiratory)	65	42	55	50
Typhoid and paratyphoid fever	71	76	122	189
Typhus fever	1,217	630	350	187
Undulant fever		1		

BRITISH EAST AFRICA

Tanganyika Territory—Cerebrospinal meningitis.—Cerebrospinal meningitis has been reported in Tanganyika Territory, British East Africa, as follows: Weeks ended—October 9, 1943, 339 cases, 28 deaths; October 16, 1943, 246 cases, 42 deaths; October 23, 1943, 241 cases, 36 deaths. The highest incidence is reported in Lake and Western Provinces.

CANADA

Provinces—Communicable diseases—Week ended October 30, 1943.—During the week ended October 30, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		5		203	273	60	45	39	85	710
Diphtheria		18	5	44	5	2	1	1	2	78
Dysentery (bacillary)				24		1			69	94
German measles		2		2	10		1	2	43	60
Influenza					28				22	50
Measles		22		315	81	18	1	25	28	490
Meningitis, meningococcus			1	4	4		1		1	11
Mumps		7	1	33	151	32	5	16	51	296
Poliomyelitis				2	1			2	2	7
Scarlet fever		9	9	114	110	45	28	35	45	395
Tuberculosis (all forms)			11	110	58	7		23	31	240
Typhoid and paratyphoid fever				13	2				12	27
Undulant fever					2					2
Whooping cough		14		113	144	13	17	6	6	313

DOMINICAN REPUBLIC

Influenza.—Influenza has been reported in the Dominican Republic as follows: Week ended September 12, 1943, 838 cases, 6 deaths; week ended September 19, 1943, 859 cases, 7 deaths.

Malaria.—During the week ended September 12, 1943, 1,766 cases of malaria with 25 deaths were reported in the Dominican Republic, and for the week ended September 19, 1943, 1,565 cases with 24 deaths were reported.

MOROCCO

Infectious diseases—May–August 1943.—During the months of May, June, July, and August 1943, cases of certain infectious diseases were reported in Morocco as follows:

Disease	May	June	July	August
Cerebrospinal meningitis	5	1	2	1
Diphtheria	3	12	22	25
Dysentery [1]	2,198	2,702	3,189	3,497
Leprosy	20	15	15	12
Measles	159	120	120	108
Plague	74	27	7	6
Poliomyelitis		9	9	10
Recurrent fever	5	11	9	4
Scarlet fever	2	4		1
Smallpox	57	28	47	60
Tuberculosis (respiratory)	840	739	714	593
Typhoid and paratyphoid fever	59	62	88	119
Typhus fever	1,921	1,225	497	155
Undulant fever			1	1

[1] Amebic and bacillary.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Smallpox

British East Africa—Kenya.—During the week ended October 23, 1943, 134 cases of smallpox were reported in Kenya, British East Africa.

British Honduras—Belize.—During the week ended November 20, 1943, 1 case of smallpox (alastrim) was reported in Belize, British Honduras.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington, D. C. • Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 DECEMBER 10, 1943 NUMBER 50

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Public Health Reports

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EMERGENCY MINIMUM SANITATION STANDARDS

CONTENTS

INTRODUCTION

General.—These Emergency Minimum Sanitation Standards constitute the third edition of the Sanitation Code for State or Local Adoption. The first edition was released in December 1940, and the second edition in May 1941, under the latter title. In this third edition the title has been changed to Emergency Minimum Sanitation Standards Recommended for State or Local Adoption, because this title expresses more correctly the purpose for which these Standards are intended.

It is realized that the development of Standards having general applicability is difficult. These Standards have been reviewed by interested official agencies and many suggested changes have been made. Nevertheless, it is probable that conflict with State or local legislation in some instances may be encountered which would prevent adoption of these Standards without modification. In such instances it is hoped that these recommended Standards will serve as a guide in the preparation of applicable State or local regulations.

War emergency.—Reference is made in various places in these Standards to materials that should be used or are preferable. It is realized, however, that during the war emergency some of the materials specified may not be obtainable. Use of substitutes will be necessary, therefore, in such instances in accord with the program of conservation of critical materials for the direct war effort.

SHORT ENABLING FORMS SUGGESTED FOR LOCAL AND STATE ADOPTION OF THESE MINIMUM STANDARDS

For use in case of local adoption:

"Be it ordained by the (city, county, district) or (name of political subdivision) that the Emergency Minimum Sanitation Standards recommended by the U. S. Public Health Service [1] shall be in force within the ____________________ of ____________________ and its police jurisdiction from and after ____________________ from the date of adoption of these Standards."

For use in case of adoption by the State Board or Department of Health: [2]

"Under authority of (give authority here) the (name of State) (name of official health agency) hereby promulgates the Emergency Minimum Sanitation Standards recommended by the U. S. Public Health Service,[1] which shall be enforced by all local health authorities having jurisdiction in all or parts of such areas as may from time to time be designated by said (name of official health agency) and by the said (name of official health agency) in all parts of such areas which are without local health service."

[1] Political subdivisions in which adoption of legislation by reference is not considered legal should adopt the Emergency Minimum Sanitation Standards, parts I to IX, which follow.

[2] The phraseology of this paragraph should conform to the legal usage of the State concerned.

Part I

WATER SUPPLIES

SECTION 1. *General.*—Every drinking, culinary, and ablutionary water supply which is hereafter constructed, or extensively reconstructed, or every existing water supply which in the opinion of the State health department is unsafe, or subject to the danger of contamination by reason of unsatisfactory location, protection, construction, operation, or maintenance, shall be made to comply with the requirements of these Standards. No such water supply shall hereafter be constructed or reconstructed without the approval of plans and specifications by the State department of health and without a written permit from said department.

SECTION 2. *Public water supplies.*—All water supplies available to the public shall comply with the requirements of the State department of health, and shall meet the requirements of the United States Public Health Service for common carrier water supplies.

SECTION 3. *Quasi-public and private surface water supplies.*—Surface water supplies shall comply with the requirements of the State department of health and shall meet the requirements of the United States Public Health Service for common carrier water supplies.

SECTION 4. *Quasi-public and private ground water supplies.*—Ground water supplies shall comply with the requirements of the State department of health and shall meet the requirements of the United States Public Health Service for common carrier water supplies, and the following requirements:

Item 1. *Location of water source with respect to potential contamination.*—Every well or spring shall be located and constructed in such manner that neither underground nor surface contamination from any cesspool, privy, or other possible source of pollution can affect such water supply. The horizontal distance from any such possible source of pollution shall be as great as possible, but in no case less than 50 feet, except as provided under item 2, or except as otherwise specified by the State or local health officer. If bacteriological examinations or other evidence indicate actual or potential pollution, the distance shall be increased or the location of the water supply changed, as may be required by the health officer.

The top of every pump room floor, pump platform, or cover of a ground water supply should not be less than 2 feet above the highest known water level of any lake, pond, stream, or any body of surface water, the water of which at the highest level would approach within 50 feet, measured horizontally, of such ground water supply. Wher-

ever possible the ground water source should be located on higher ground than any source of contamination.

Item 2. *Sewerage near wells or springs.*—No floor drain, soil pipe, main drain, or other pipe which is directly connected to a storm or sanitary sewer, or through which water or sewage from any source may back up, shall be located nearer than 20 feet to any well, spring, or other source of water supply. All pipes and drains or parts thereof through which sewage or waste water flows, or into which sewage or waste water may back up, which are located within 50 feet of any such water supply, shall be constructed of extra heavy cast-iron soil pipe or cast-iron water pipe with leaded joints, or be of equivalent construction in the opinion of the State department of health or local health department having jurisdiction.

Item 3. *Leakage from toilets and sewers.*—No toilet, sewer, soil pipe, or drain shall be located over or where leakage therefrom can reach any water storage basin, reservoir, source of water supply, or pump room.

Item 4. *Pits near water supply.*—There shall be no pits or unfilled space below level of ground surface, any part of which is within 10 feet of such water supply, except well, pump, or valve pits conforming to the requirements of item 9.

Item 5. *Well casing or lining.*—All that part of the suction pipe or drop pipe of any well within 10 feet of and below the ground surface, and preferably within 20 feet, shall be surrounded by a watertight casing pipe extending above the ground, platform, or floor surface as the case may be, and covered at the top as required by items 7 and 8. In certain types of wells, and frequently in reconstructing old wells, the above-mentioned watertight casing may be of smaller diameter than an existing or newly installed lower casing below the ground surface, and not connected thereto. In such instances the lower casing shall be cut off at least 10 feet below the ground surface and the annular space at this cut-off point, between the lower and upper casings, shall be closed with a suitable watertight cover over which shall be placed a compact earth fill to prevent settling at the ground surface: *Provided,* That a dug well, in lieu of such casing pipe, may be provided with a substantial watertight lining of concrete or vitrified tile, with outer concrete lining 6 inches thick, or other suitable material. Such lining shall extend down for a distance of at least 10 feet and shall extend up to the well platform or pump room floor with a watertight connection. In such case the platform or floor shall have a suitable sleeve pipe surrounding the suction pipe or drop pipe and projecting above as herein provided for a casing pipe. With the approval of State health authorities, the impervious lining of dug wells in particular instances may be of lesser depth.

Item 6. *Cover or floor.*—Every well, spring, or other structure used

as a source of water, or for the storage of water, shall be provided with a watertight cover; such covers and pump room floors shall be constructed of concrete or similarly impervious material so as to provide proper drainage from the cover or floor and prevent contamination of the water supply. Such cover or floor shall be constructed so that there are no copings, parapets, or other features which may prevent proper drainage, or by which water can be held on the cover. Well casings shall project at least 6 inches above ground level or the top of this cover or floor, and the cover or floor shall slope away from the well casing or suction pipe in all directions. Dug well linings shall extend at least 6 inches above the ground surface and cover installed thereon. The cover shall be watertight, properly grouted in place, and its edges shall overlap at least 2 inches over the walls or curbings of such wells.

Item 7. *Hand pump head and base.*—Every hand-operated pump shall have the pump head closed by a stuffing box or other suitable device to exclude contamination from the water chamber. The pump base shall be of solid one-piece recessed type of sufficient diameter and depth to admit the well casing as hereinafter provided. The top of the casing or sleeve of every well equipped with such a pump shall project into the base of the pump at least 1 inch above the bottom thereof and shall extend at least 6 inches above the level of the platform, well cover, or pump room floor on which the pump rests. The pump shall be fastened to the casing or sleeve by means of a flange connection, and shall not be attached to the platform. The annular space between well casing and suction pipe shall be closed to prevent entrance of contamination. In wells located where frost heaving occurs, or in wells constructed with a buried concrete slab, the well casing, where it passes through the concrete well cover slab, shall be incased in suitable plastic and impervious material not less than one-half inch thick. (A high-grade roofing cement or similar material which remains plastic at low temperatures, and is readily applied by troweling, is a suitable material.)

Item 8. *Power pump base.*—Where power pumps are placed directly over the well, the pump shall have a solid, watertight, metal base without openings, to form a cover for the well, recessed to admit the well casing, and the well casing shall project into the base at least 1 inch above the bottom thereof, and at least 1 inch above the level of the foundation on which the pump rests, which in turn shall be at least 5 inches above the top of the cover or floor; or, in lieu of such base, a separate watertight metal cover or other watertight closure in which the casing projects in like manner may be used. Where power pumps are not placed directly over the well, the well casing shall extend at least 6 inches above the floor of the pump house. The annular space between well casing and suction pipe shall be closed to

prevent entrance of contamination: *Provided,* That the base or cover may have an air vent constructed as hereinafter prescribed.

Item 9. *Well, pump, valve, and pipe pits.*—No wellhead, well casing, pump, pumping machinery, valve connected with the suction pump, or exposed suction pipe, shall be located in any pit, room, or space extending below ground level, or in any room or space above the ground which is walled in or otherwise enclosed, so that it does not have free drainage by gravity to the surface of the ground: *Provided,* That this shall not apply to a dug well properly constructed as herein prescribed, nor to private supplies serving an individual dwelling.

The requirements of this item shall be enforced only for water supply structures which are installed subsequent to the adoption of these Standards, but existing pits may be accepted provisionally only if constructed in accordance with the requirements of the State department of health.

Item 10. *Manholes.*—Manholes may be provided on dug wells, reservoirs, tanks, and other similar water supply structures. Every such manhole shall be fitted with a watertight collar or frame having edges which project at least 6 inches above the level of the surrounding surface, and shall be provided with a solid watertight cover having edges which overlap and project downward at least 2 inches around the outside of the frame. Such covers shall be of standard design whenever possible to eliminate special fittings. The cover shall be kept locked at all times except when necessary to open the manhole.

Item 11. *Vent openings.*—Any reservoir, well, tank, or other structure containing water for any such water supply may be provided with vents, overflows, or water-level control gages constructed so as to prevent the entrance of birds, insects, and contaminating materials. Openings or vents shall face downward and shall be not less than 2 feet above the floor of a pump room, the roof or cover of a reservoir, the ground surface, or the surface of other water supply structures.

Item 12. *Air-lift systems.*—The air intake for any air-lift system or mechanical aerating apparatus shall be at least 6 feet above the floor surface if indoors, and 10 feet above the ground if out-of-doors, and at such elevation as to prevent flooding. The air intake shall be so constructed as to prevent the entrance of birds, insects, and contaminating materials. Every air-lift system shall be equipped with effective oil traps, tanks, or filters to prevent oil or other contaminating materials from entering the water.

Item 13. *Lubrication of pump bearings.*—Pump bearings situated in any well below the pump-room floor shall be lubricated either with water from the well or some other approved source, or lubricated in such other manner as may be approved by the State department of health.

Item 14. *Priming of power pumps.*—Water for priming pumps on any water system shall be taken directly from the reservoir or distribution system which is supplied with water from the original source of water supply or from another supply approved by the State department of health. Priming devices shall be so constructed as not to expose the water to dust, drippings, or other sources of contamination.

Item 15. *Priming of hand pumps; buckets.*—Hand-operated pumps shall have cylinders submerged so that priming shall not be necessary. No pail and rope, bailer, or chain-bucket systems shall be used.

Item 16. *Treatment or abandonment of unsatisfactory ground water supplies.*—Ground water supplies which do not comply with the bacteriological requirements recommended by the United States Public Health Service for common carrier water supplies shall be treated by methods approved by the State department of health; if it is impossible to secure compliance with said requirements, said water supply shall be abandoned. All abandoned wells shall be sealed to protect the water-bearing formation against possible contamination:

(*a*) Drilled, cased, and driven wells shall be completely filled with neat cement grout, concrete, or clean puddled clay.

(*b*) Dug or bored wells shall be completely filled with clean puddled clay or its equal after as much as possible of the curbing is removed.

SECTION 5. *Disinfection of new or accidentally contaminated water supplies.*—New water supplies and water supplies which may have become contaminated accidentally or otherwise shall be thoroughly disinfected with chlorine before being placed in use. The rate of chlorine-water mixture flow shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the pipe shall be at least 50 p. p. m. Treated water shall be retained in the pipe long enough to destroy all nonsporeforming bacteria. The period shall be at least 3 hours and preferably longer, as may be directed. After the chlorine-treated water has been retained for the required time, the chlorine residual at pipe extremities and at other representative points shall be at least 5 p. p. m. If the residual is less than 5 p. p. m., the disinfection procedure shall be repeated until a 5 p. p. m. residual is obtained, as required above. Upon completion of the disinfection process the water containing residual chlorine should be flushed from the system and water samples should be collected for bacteriological examination. The supply should not be used until the tests show that the water conforms to the bacteriological requirements of the United States Public Health Service Drinking Water Standards.

SECTION 6. *Connection with unsafe water sources forbidden.*—There

shall be no cross-connection, auxiliary intake, bypass, backflow connection, or other arrangement including overhead leakage whereby unsafe water, or water from a source that does not comply with these requirements, may be discharged or drawn into any drinking, culinary, or ablutionary supply which does comply with these requirements.

Item 1. *Definitions.*

(*a*) *Cross-connection.*—Any physical connection whereby the approved supply is connected with any other water supply system, whether public or private, either inside or outside of any building or buildings in such manner that a flow of water into the approved water supply is possible either through the manipulation of valves or because of ineffective check or back pressure valves, or because of any other arrangement.

(*b*) *Auxiliary intake.*—Any piping connection or other device whereby water may be secured from a source other than that normally used.

(*c*) *Bypass.*—Any system of piping or other arrangement whereby the water may be diverted around any part or portion of a water purification plant.

(*d*) *Backflow connection.*—Any system of piping or other arrangement whereby the public water supply is connected directly with a sewer drain, conduit, pool, storage reservoir, or other device which does or may contain sewage or other waste or liquid which would be capable of imparting contamination to the approved water supply.

Item 2. No plumbing fixture or device shall be supplied directly from an approved water supply system through a flushometer or other valve unless such valve is installed in a manner such as to reduce to a minimum the possibility of polluting the water supply.

Item 3. No plumbing fixture, device, or construction shall be installed which will provide connection between a distribution system for an approved drinking, culinary, or ablutionary water supply and a drainage, soil, or waste pipe so as to permit or make possible the backflow of sewage or waste into the water supply system.

Item 4. Water from any drinking, culinary, or ablutionary supply complying with these requirements may be supplied to any other system containing water of questionable quality only by means of an independent line discharging at least two pipe diameters and not less than 6 inches above the rim of storage units open to atmospheric pressure or by other methods approved by the State department of health.

SECTION 7. *Outlets from unsafe water supplies required to be sealed or labeled.*—All outlets from water sources which do not comply with these requirements shall be sealed, or, at the discretion of the State or local health officer having jurisdiction, be provided with a permanent and easily readable tag or label reading "UNSAFE WATER. DO NOT

DRINK." Removal of said label or tag, except by permission of the health officer having jurisdiction, shall be deemed a violation of these requirements.

SECTION 8. *Distribution and storage.*

Item 1. *Plumbing.*—All plumbing installed for water supply purposes shall comply with the requirements of the Plumbing Manual, National Bureau of Standards Report B. M. S. 66, November 1940, a copy of which shall be on file at the office of ...., or its equivalent in the opinion of the State department of health, or as otherwise provided by law. During the war emergency the Emergency Plumbing Standards for Defense Housing (issued by the Division of Defense Housing Coordination, Office for Emergency Management, Washington, D. C., 1942) shall be adhered to insofar as use of substitute materials in place of critical materials such as copper and brass and other critical items is concerned.

Item 2. *Plumbing fixtures.*—All plumbing fixtures shall comply with the Federal Specification for Plumbing Fixtures, March 30, 1940, WW-P-541a, a copy of which shall be on file at the office of ...., or its equivalent in the opinion of the State department of health, or as otherwise provided by law. The requirements of this specification with respect to air gaps and backflow preventers shall be strictly enforced.

Item 3. *Common drinking cups.*—The use of common drinking cups is forbidden.

Item 4. *Drinking fountains.*—Drinking fountains shall meet the following requirements adopted by the Joint Committee on Plumbing of the American Public Health Association and the Conference of State Sanitary Engineers, and shall comply with Federal Specification WW-P-541a of March 30, 1940.

(*a*) The fountain should be constructed of impervious material, such as vitreous china, porcelain, enameled cast iron, other metals, or stoneware.

(*b*) The jet of the fountain should issue from a nozzle of nonoxidizing, impervious material set at an angle from the vertical such as to prevent the return of water in the jet to the orifice or orifices from whence the jet issues. The nozzle and every other opening in the water pipe or conductor leading to the nozzle should be above the edge of the bowl, so that such nozzle or opening will not be flooded in case a drain from the bowl of the fountain becomes clogged.

(*c*) The end of the nozzle should be protected by nonoxidizing guards to prevent the mouth and nose of persons using the fountain from coming into contact with the nozzle. Guards should be so designed that the possibility of transmission of infection by touching the guards is reduced to a minimum.

(*d*) The inclined jet of water issuing from the nozzle should not touch the guard and thereby cause splattering.

(*e*) The bowl of the fountain should be so designed and proportioned as to be free from corners which would be difficult to clean or which would collect dirt.

(*f*) The bowl should be so proportioned as to prevent unnecessary splashing at a point where the jet falls into the bowl.

(*g*) The drain from the fountain should not have a direct physical connection with a waste pipe, unless the drain is trapped.

(*h*) The water supply pipe should be provided with an adjustable valve fitted with a loose key or an automatic valve permitting the regulation of the rate of flow of water to the fountain so that the valve manipulated by the users of the fountain will merely turn the water on or off.

(*i*) The height of the fountain at the drinking level should be such as to be most convenient to persons utilizing the fountain. The provision of several steplike elevations to the floor at fountains will permit children of various ages to utilize the fountain.

(*j*) The waste opening and pipe should be of sufficient size to carry off the water promptly. The opening should be provided with a strainer.

Item 5. *Water distribution lines.*—The distribution system shall be designed and constructed so as to prevent leakage of water due to defective materials, improper jointing, corrosion, settling, impacts, freezing, or other causes. Adequate valves and blow-offs shall be provided so that necessary repairs can be made with a minimum interruption of service.

(*a*) *Leakage test.*—Newly laid pipe lines, before covering, shall be tested under a hydrostatic pressure 50 percent in excess of the normal operating pressure after expelling all air from the pipe. The duration of each pressure test shall be at least 30 minutes.

All exposed pipes, fittings, valves, hydrants, and joints should be carefully examined during the open trench test. All joints made with lead showing visible leakage should be recaulked until tight. Where the joints are made with sulfur compound or with cement and show seepage or slight leakage only such joints as may be defective should be cut out and replaced. Any cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this pressure test should be removed and replaced with sound material, and the test should be repeated until the pipe-installation is satisfactory.

Suitable means should be provided for determining the quantity of water lost by leakage under normal operating pressure. No pipe installation should be accepted until or unless this leakage (evaluated on a pressure basis of 150 pounds per square inch) is less than 100 gallons per 24 hours per mile of pipe per inch nominal diameter for

pipe in 12-foot lengths, 75 gallons for 16-foot lengths, and correspondingly varied for other lengths of pipe. In calculating leakage, allowance should be made for added joints in the pipe line above those incidental to normal unit lengths of pipe.

(*b*) *Water pressure.*—The piping system shall be designed and installed to maintain a positive pressure in all its parts under normal usage at all times.

(*c*) *Dead ends.*—The system should be designed so as to afford effective circulation of water with a minimum of dead ends. All dead ends of sizes larger than 1½ inches in diameter shall be equipped with blow-offs.

(*d*) *Jointing materials.*—Jointing materials shall be free from oil, greasy substances, or tar and shall be disinfected and kept free from contamination and applied dry. They shall be of a character such as not to foster the growth of coliform bacteria.

(*e*) *Water lines near sewers.*—Water and sewer lines shall be laid in separate trenches and at least 10 feet apart. Where a water service pipe crosses a street sewer at less than 6 feet vertically above the sewer or is within 10 feet of it horizontally, all that part of the water pipe lying within these distances should be constructed of copper or brass pipe connected to the iron pipe with a brass fitting. In such cases it is preferable to use copper or brass pipe from the water main to the house, and the house sewer should be constructed of extra heavy cast-iron pipe with watertight joints. Where critical materials cannot be obtained, due to the war emergency, extra heavy iron pipe should be used in place of copper and brass pipe.

(*f*) *Stream crossings.*—Where it is necessary to lay water supply lines across streams, an overhead crossing should be made whenever this is feasible. If overhead crossings cannot be provided, special precautions should be observed to prevent the entrance of surface water into the water supply line, and to prevent damage to the line by currents, ice, floating objects, anchors, dredges, etc. Laying the line at least 5 feet below the bottom of the body of water, use of flexible watertight joints, and cradling the pipe in concrete are items requiring consideration in such installations. If the crossing is a vital part of the water supply system, consideration should be given to construction of underwater crossings in duplicate to assure continuity of service.

(*g*) *Sanitary conditions surrounding water pipes and pipe laying.*—Where avoidable, water pipes shall not be laid in water or where they can be flooded with water or sewage in laying. When necessary to lay water pipes below the water table or in wet ground, additional protection shall be provided for the joints, to insure watertightness to the satisfaction of the State or local health officer having jurisdiction. New water mains shall be flushed thoroughly through hydrants

or other approved means to remove all dirt and foreign matter. The mains shall then be disinfected in accordance with the procedure set forth in section 5 of this part of the Standards. New mains should not be put into service until satisfactory bacteriological results are obtained as required in section 5.

Item 6. *Storage.*—All reservoirs, cisterns, and storage tanks shall be of watertight construction and made of concrete, steel, or wood: *Provided,* That when such reservoirs or storage tanks are buried in the ground or located underground, wood shall not be used therefor. All such storage units shall be properly covered to avoid contamination and shall be so located or protected that there will be no danger of contamination by surface drainage or flooding.

SECTION 9. *Bacteriological examinations.*

Item 1. *Collection of samples.*—Water samples for bacteriological examinations shall be collected in accordance with the directions accompanying the sterilized bottles obtained from the State department of health or other laboratories approved by the State health officer. Care should be taken to obtain a sample that is truly representative of the water to be tested and to see that no contamination occurs at the time of filling the bottles or prior to examination. Samples should be collected preferably by trained personnel.

Item 2. *Shipment of water samples.*—The samples shall be labeled definitely as to source, date, and time of collection. All samples should be examined as promptly as possible after collection. The time allowed for storage or transportation of a bacterial sample between the filling of the sample bottle and the beginning of the analysis should not be more than 6 hours for impure waters and not more than 12 hours for relatively pure waters. During the period of storage, the temperature should be kept between 6° C. and 10° C. Any deviation from the above limits shall be so stated in making reports.

Samples of any disinfected water supply must be freed of any disinfecting agent within 20 minutes of the time of their collection. (In freeing samples of chlorine or chloramines, the procedure given in the Standard Methods for the Examination of Water and Sewage, eighth edition, 1936, published by the American Public Health Association, par. A–1, option 1, or par. A–2 shall be followed.)

Part II

SEWAGE AND INDUSTRIAL WASTES, AND EXCRETA DISPOSAL[1]

SECTION 1. *Requirements when discharged into surface waters.*—All sewage and industrial wastes which are discharged into any surface water shall be treated in such manner as will conform with the requirements of the State department of health. No sewage or industrial

[1] The provisions of this part of these Standards are in accord with the Recommendations of the Joint Committee on Rural Sanitation (Public Health Reports, vol. 58, No. 11, March 12, 1943—Reprint No. 2461).

waste treatment plant which discharges effluent into any surface water shall be constructed or reconstructed hereafter without the approval of plans and specifications by the State department of health, and without a written permit from said department.

SECTION 2. *Requirements when used for irrigating purposes.*—All sewage or sewage effluents used for irrigating purposes shall be treated in such manner as will conform with the requirements of the State department of health. No sewage or sewage effluents shall be used for irrigating purposes without a written permit from said department.

SECTION 3. *Requirements for connection to sewers.*—Where there is an established sewerage system, all premises within 300 feet of a sewer main or lateral shall be connected therewith provided the sewer main or lateral is in a street or alley abutting the property and accessible by gravity flow.

SECTION 4. *Requirements when discharged into the soil.*—No excreta or sewage shall be introduced hereafter into the soil except in compliance with the following requirements:

A—Requirements for water carriage systems.

Item 1. *Influent sewers.*—(*a*) *Type:* Influent sewers used to conduct sewage from a building to a private sewage treatment plant shall be constructed of cast iron, vitrified clay, or other approved sewer pipe with bitumen or oakum and cement joints, or other types of joints approved by the health officer having jurisdicton (root-proof joints, preferably). In no case shall such sewer be nearer than 20 feet to a well, spring, other source of water supply, or suction line from such sources. All such sewers, drains, and pipes, or parts thereof, which are located between 20 and 50 feet (or such greater distance as may be specified by the State department of health) from a well, spring, other source of water supply, or suction line from such sources, or within 10 feet horizontally of any drinking water supply line under pressure, or within 10 feet of any roadway crossing, shall be constructed of extra heavy cast-iron soil pipe, or cast-iron water pipe, with tested watertight lead joints. (*b*) *Size:* Such influent sewers shall be not less than 6 inches in diameter for vitrified clay or concrete sewers and not less than 4 inches in diameter for cast-iron sewers. (*c*) *Grade:* Such influent sewers shall be laid to a minimum grade of not less than 12 inches per 100 feet. (*d*) *Cleanouts:* Cleanouts shall be provided at every change in line in excess of 45° and at every change in grade in excess of 22½° (cleanouts are desirable within 5 feet of the septic tank where tanks are located more than 20 feet from the building. An economical cleanout can be provided by inserting a T in the line with the vertical leg extending to ground level and plugged with a brass cap. If the sewer line is deeper than 4 feet below the ground surface, manhole construction would be required for cleanout purposes.)

Item 2. *Grease interceptors.*—Septic tanks shall be designed to provide storage for grease or else grease interceptors of a type approved by the State department of health, and conforming with local or municipal codes where such are in force, shall be installed between the building and treatment plant for all except small residential installations. The grease interceptors shall be located as close as practicable to the point at which the grease enters the influent sewer and shall be easily accessible for cleaning. Grease interceptors shall be cleaned as often as necessary to insure their proper operation, but at intervals of not more than 30 days in any case.

Item 3. *Septic tanks.*—Septic tanks shall comply with the following requirements: (*a*) *Location:* Septic tanks shall be located at least 50 feet, or such distance as may be specified by the State department of health, from any well, spring, or other source of water supply, and, if possible, upon ground at a lower elevation; (*b*) *Capacity, proportions, and materials:* Every septic tank shall have a capacity of at least the average volume of sewage flowing into it during a period of 24 hours, but in no case less than 500 gallons. The length of the tank shall be at least twice the width, and the tank shall have a water depth of at least 4 feet. Cylindrical tanks and small tanks with limited sludge space, cast in one piece or in sections, are not recommended. Septic tanks shall be built either of concrete or other material not subject to excessive corrosion or decay and approved by the State health officer; (*c*) *Manholes:* All septic tanks with solid covers shall be provided with at least one manhole, 24 inches or more in diameter, located over the inlet to the tank. The manhole shall extend to the surface of the ground if the earth fill above the tank is more than 12 inches deep; (*d*) *Inlets and outlets:* The inlet and outlet ends of a septic tank should be provided with submerged inlets and outlets or with baffles located about 12 inches from the inlet and outlet walls. Inlet baffles should extend 12 inches below the liquid level, and outlet baffles 15 to 18 inches below the liquid level, and they should project not less than 6 inches above the liquid level. The invert of the inlet shall be at an elevation 3 inches above the invert of the outlet; (*e*) *Freeboard:* The vertical distance between the flow line and the under side of the tank cover shall be not less than 12 inches for tanks of 500 gallons capacity.

Item 4. *Dosing tanks and automatic siphons.*—Dosing tanks and automatic siphons of a type approved by the State department of health shall be used in all cases designated by the State department of health. All proposed installations of septic tanks of 1,000 gallons or more shall be brought to the attention of the State department of health by the health officer, and an opinion requested as to whether dosing tanks and automatic siphons shall be required.

Item 5. *Subsurface disposal systems.*—Subsurface tile systems, where used, shall comply with the following requirements: (Other types of subsurface systems of a larger capacity than tile, or seepage pits which are approved by the State department of health, may be used.) (*a*) *Location:* Subsurface tile systems shall be located at least 100 feet, or such distance as may be specified by the State department of health, from any well, spring, or other source of water supply, and, if possible, upon ground at a lower elevation (a minimum distance of 50 feet from drilled wells will be permissible when the casing extends watertight to a depth of 50 feet or more); at least 25 feet, or such distance as may be specified by the State department of health, from any stream or other body of surface water, and at least 10 feet from dwellings and property lines; (*b*) *Dimensions of tile trenches:* Where climatic conditions permit, the subsurface tile trenches shall be from 18 to 24 inches deep, preferably 18 inches (greater depths may be necessary to prevent freezing in cold climates; in such cases, other designs, using seepage pits, should be considered); shall be from 18 to 24 inches wide; shall be provided with a 10-inch depth of washed gravel, crushed shell or stone, slag, rock spalls, or clean run-of-bank gravel; shall have a distance between laterals equivalent to at least three times the trench width and not less than 6 feet center to center of tile; shall have a maximum length of any one lateral of not to exceed 100 feet, and at least 2 lines of tile should be provided; total length of tile lines shall be prescribed by the State health department. The total length of subsurface tile trench required may be determined for each installation from the following:

Approximate length of 4-inch tile required when the sewage flow is 50 gallons per capita per day[1]

Nature of soil:	*Feet per person*
Clean coarse sand or gravel	15
Fine sand or light loam	20
Fine sand with some clay or loam	30
Clay with some sand or gravel	80
Heavy clay	Unsuitable

At least 75 feet of tile should be provided for a dwelling used for temporary occupancy such as a summer camp, and not less than 100 feet of tile should be provided for a dwelling to be occupied throughout the year, regardless of the number of persons or soil conditions.

If there is doubt relative to soil conditions, the lengths of tile to be provided should be determined by the percolation test described below:

METHOD OF MAKING PERCOLATION TEST

1. Excavate a hole 1 foot square and to the depth of the proposed

[1] From Bulletin No. 26, New York State Department of Health, "Rural Water Supply and Sewage Disposal System."

disposal trenches. This depth in most instances will be approximately 24 inches and should not exceed 36 inches.

2. Fill the hole with water to a depth of at least 6 inches, and allow this water to seep away. Judgment is required in determining how soil conditions at time of test vary from year-round average conditions. Where soil appears exceptionally dry, or where soil conditions are questionable, greater depths of water may be used or the test may be repeated. In no case shall tests be made in filled or frozen ground. Where fissured soil formations are encountered, tests should be made only as directed by and under the supervision of a representative of the State health department.

3. Observe the time in minutes required for the water to seep away completely. This time divided by the total number of inches of water placed in the hole gives the average time required for the water to drop 1 inch. With this information, the effective absorption area required for each individual system may be determined from table 1.

TABLE 1.—*Data for determining field requirements from percolation tests*

Time required for water to fall 1 inch (in minutes)	Effective absorption area required in bottom of disposal trenches in square feet		
	Residences (per bedroom)	Camps (per person)	Schools (per person)
2 or less	52	13	9
3	60	15	10
4	72	18	12
5	80	20	13
10	105	24	18
15	126	32	21
30	180	45	30
60	240	60	40
Over 60	Special design using seepage pits or sand filter trenches.		

NOTE.—A minimum of 150 square feet should be provided for each individual family dwelling unit.

(*c*) *Tile size:* The subsurface tile shall have a diameter of not less than 4 inches; (*d*) *Position and grade of tile:* The subsurface tile lines shall be laid with not less than 6 inches of filter material below the bottom of the tile, and on a grade of 2 to 4 inches per 100 feet. Open joints of ¼ to ½ inch should be provided between tile sections; (*e*) *Nature of effluent to be discharged to tile:* Septic tanks must be operated so that sludge shall not enter the subsurface tile system. The ground water level must be below the level of the trench bottom.

Item 6. *Other methods of sewage treatment.*—Other methods of sewage treatment, where permitted or required by the State health officer, shall be installed only in accordance with plans and specifications which have been approved specifically for each installation by the State department of health.

B—Requirements for approved earth pit toilets.

Pit toilets hereafter constructed, or required by the health officer having jurisdiction to be reconstructed, shall comply with the following requirements:

Item 1. *Location.*—Pit toilets shall be located at least 50 feet, or such distance as may be specified by the State department of health, from any well, spring, or other source of water supply and, if possible, upon ground at a lower elevation. Consideration should be given to the direction of prevailing winds to reduce fly and odor nuisances. The privy pit should not encroach within 6 feet of any building line or fence to allow for proper construction and maintenance. In cavernous or loosely stratified formations where water supplies may be polluted, chemical toilets or concrete vault toilets may be required by the State or local health officer having jurisdiction.

Item 2. *The pit.*—The pit shall have an original minimum capacity of not less than 50 cubic feet and shall be so excavated that the cribbing, when inserted, shall make a firm, uniform contact with the earth walls on all sides.

Item 3. *Pit cribbing.*—The pit cribbing shall extend 1 to 2 inches above the original ground line, and to the full depth of the pit, unless in tight clay or rock formation, in which case the lower section of the cribbing may be omitted.

Item 4. *Sills.*—In case of concrete slab privies, concrete sills shall be placed around and just outside the top of the pit cribbing, on which to set the slab. These sills shall be at least 5 inches wide and extend down at least 4 inches to firm earth. In case of wood floor privies and if concrete sills are not used, there shall be constructed a mud sill of durable wood of 4- by 6-inch pieces.

Item 5. *Pit mound.*—An earth mound at least equal to the thickness of the concrete sill shall be constructed, with a level area of 18 inches extending away from the slab. The floor of the building should be at least 6 inches above the surrounding natural ground level.

Item 6. *Seat riser.*—The bench or seat riser shall have an inside clearance of not less than 21 inches between the front and rear walls, and not less than 12 inches between the side walls. The top of the seat shall be not less than 12 or more than 16 inches from the floor. The seat riser shall be so constructed and bonded with the floor as to prevent seepage through the riser upon the floor. (Impervious materials such as concrete are believed to be most suitable for the riser.)

Item 7. *Seat cover.*—The seat opening shall be covered with a lid, hinged so as to provide a clearance of not less than 3½ inches horizontally between the back of the seat opening and lid when raised. The lid shall be so constructed and installed that when closed it will exclude flies.

Item 8. *Floor and riser.*—The floor and riser shall be built of impervious material or tongue-and-grooved lumber, in a manner to exclude flies. The floor and bench, or riser, for a single unit shall cover an area of at least 16 square feet.

Item 9. *Superstructure.*—The house shall be rigidly constructed and shall provide privacy and protection from the elements. Except where climatic conditions prohibit, the building shall be ventilated by leaving a 4-inch opening at the top of the walls just beneath the roof. The building should be covered preferably with a single-plane roof having a pitch of 1 in 4 and an overhang of not less than 5 inches front, 13 inches back, and 9 inches on each side, with a facing board not less than 6 inches wide extending around the entire margin of the roof.

Item 10. *Maintenance and operation.*—The following shall be considered defects in pit toilet installations: (*a*) Evidence of caving around the edges of the pit; (*b*) signs of overflow or other evidence that the pit is full; (*c*) seat covers open; (*d*) uncleanliness of any kind in the toilet building; and (*e*) evidence of light entering pit except through seat when seat cover is raised.

C—Requirements for approved vault toilets.

Vault toilets may be approved by the State health officer where earth pit toilets might contaminate water supplies. All such vault toilets which are hereafter constructed or are required by the health officer to be reconstructed shall comply with the following requirements:

Item 1. The requirements for seat riser, seat cover, floor and riser, superstructure, maintenance and operation for concrete vault toilets shall be as stated under items 6, 7, 8, 9, and 10, of section 4B, "Requirements for approved earth pit toilets."

Item 2. *The construction features of vault.*—The vault shall be built of brick, stone, or concrete, preferably the latter, with walls and bottom of vault at least 6 inches thick. Special precautions shall be taken to secure a watertight vault; construction joints shall be avoided. The vault shall not extend more than 4 feet below the original ground level to facilitate cleaning, and the vault walls shall extend at least 6 inches above the original ground lev l. A tight-fitting trap door shall be provided over the vault, outside the building, to allow removal of the vault contents. The trap door shall be so constructed and installed that when closed it will exclude flies. The vault capacity may be determined by allowing 6 cubic feet of space per person per year.

Item 3. *Disposal of wastes from vault toilets.*—The wastes from vault toilets shall be buried as far as possible from wells or other sources of water supply, or disposed of in other places where water supplies will not be polluted, and where nuisances will not be created. The

wastes shall not be discharged into streams, ponds, or other bodies of water, or onto the surface of the ground.

D—Requirements for approved chemical toilets.

Chemical toilets may be approved by the State health officer in areas where pit toilets might contaminate water supplies, or where a sufficient volume of water for the operation of flush toilets is not available. Chemical toilets should be used only where there is assurance of constant maintenance and where safe disposal of the final product is assured. All such chemical toilets which are hereafter constructed or which are required by the health officer to be reconstructed shall comply with the following requirements:

Item 1. *Tanks.*—Chemical toilets shall have a receiving tank of impervious and not easily corrodible material with an easily accessible opening for cleaning. The thickness of the tank metal shall be not less than 12 gage. The tank shall be equipped with an agitator for the purpose of mixing solids with the chemical charge.

Item 2. *Toilet bowls.*—The toilet bowl shall be constructed of impervious and not readily corrodible material and shall be elevated above the receiving tank sufficiently to avoid splashing the user.

Item 3. *Vent.*—The tank and bowl shall be vented with screened pipe at least 4 inches in diameter, preferably constructed of cast iron, and shall extend at least 2 feet above the roof line. Vent pipes on chemical toilets, when installed in the vertical tube forming the toilet bowl, shall be installed at an angle of not over 30° from the vertical, in order to minimize difficulties from clogging and corrosion.

Item 4. *Chemical charge.*—A chemical having a high phenol coefficient shall be diluted with the proper amount of water and added to the tank; the contents of the tank shall be removed and replaced with a new chemical solution as often as may be necessary to maintain sanitary conditions.

Item 5. *Toilet rooms.*—Chemical toilets shall be located in rooms which are well-lighted and ventilated and which are not directly connected with living or working quarters. Chemical toilets or tank cleanouts should not be located in basements.

Item 6. *Disposal of chemical toilet wastes.*—The wastes from the chemical tanks shall be buried as far as possible from wells or other sources of water supply, or disposed of to other places where water supplies will not be polluted and where nuisances will not be created. The wastes shall not be discharged into streams, ponds, or other bodies of water or onto the surface of the ground. (Neither sludge nor liquid effluent from chemical toilet tanks should be discharged to a sewerage system where treatment processes are involved. Otherwise the chemical constituents of the sludge or liquid effluent may

seriously interfere with the biological action upon which such treatment processes depend.)

SECTION 5. *Requirements for comfort stations.*—All comfort stations which are made available for use of patrons of establishments, or for the use of the general public, shall comply with the following requirements:

Item 1. *Water pressure.*—The pressure and volume of water shall be sufficient to insure effective flushing of toilets and urinals.

Item 2. *Construction and cleanliness of toilets and urinals.*—Toilets and urinals shall be constructed of vitreous or other approved material, the surface of which is smooth, hard, impervious, and not easily corrodible, shall be of rim flush type, and shall be properly vented and trapped. All joints shall be tight. The construction shall be such as to provide ample flushing action to insure cleanliness. Installations made subsequent to the adoption of these Standards shall be constructed in a manner approved by the State department of health to prevent backsiphonage of the toilet or urinal contents. All toilets and urinals shall be kept clean and in good repair.

Item 3. *Toilet rooms.*—All toilets and urinals shall be located in well-lighted and well-ventilated rooms and shall be conveniently accessible to approved handwashing facilities. All toilet rooms shall be kept clean and in good repair.

Item 4. *Approved hand-washing facilities.*—Approved hand-washing facilities shall comply with the following requirements: (*a*) *Lavatory:* The lavatory shall be composed of vitreous or other approved material, the surface of which is smooth, hard, impervious, and not readily corrodible. Taps connected with said lavatory shall be so installed as to discharge at least one inch above the level at which the lavatory will overflow upon the floor; (*b*) *Water supply:* The water supply used in connection with said lavatory shall comply with the requirements of part I of these Standards entitled "Water supplies;" (*c*) *Soap and towels:* Soap in a suitable dispensing container and single-service paper towels or some other form of individual towel service approved by the health officer shall be provided.

Item 5. *Protection against freezing.*—All fixtures shall be properly protected against freezing.

Item 6. *Minimum plumbing requirements.*—All plumbing shall comply with part VIII, section 3, of these Standards.

Part III

MILK AND MILK PRODUCTS

SECTION 1. The production, transportation, processing, handling, sampling, examination, grading, labeling, regrading, and sale of all milk and milk products, the inspection of dairy herds, dairies, and milk

plants, the issuing and revocation of permits to milk producers and distributors, and the placarding of restaurants and other establishments serving milk or milk products shall be regulated in accordance with the terms of the unabridged form of the 1939 edition of the Milk Ordinance and Code Recommended by the United States Public Health Service, a certified copy of which shall be on file in the office of the (-------------------): *Provided*, That the words "city of (---------------)" in said unabridged form shall be understood to refer to -------------------[1]: *Provided further*, That in section 7, item 1r of said unabridged form the abortion-testing requirement shall be effective within (time) ------------------- after the adoption of this ordinance: *Provided further*, That section 8 of said unabridged form shall be replaced by section 2 below.

SECTION 2. From and after the date on which these Standards take effect, no milk or milk products, except grade A pasteurized, shall be sold to the final consumer, or to restaurants, soda fountains, grocery stores, or similar establishments: *Provided*, That when any milk distributor fails to qualify for this grade the State or local health officer having jurisdiction is authorized to revoke his permit or, in lieu thereof, to degrade his product and permit its sale during a temporary period not exceeding 30 days or in emergencies such longer period as he may deem necessary.[2]

Part IV

FROZEN DESSERTS

SECTION 1. The production, manufacturing, mixing, preparing, processing, pasteurizing, freezing, packaging, transportation, handling, sampling, examination, labeling, and sale of all mix and frozen desserts, the inspection of all establishments engaged in the production, processing, and distribution of mix and frozen desserts, the issuing and revocation of permits to frozen desserts plants, the grading and regrading of frozen desserts plants, and the displaying of grade placards shall be regulated in accordance with the terms of the unabridged form of the 1940 edition of the Frozen Desserts Ordinance Recommended by the U. S. Public Health Service, a certified copy of which shall be on file in the office of (-------------------): *Provided*, That the words "municipality of ---------------" in said unabridged form

[1] Insert name of community or, in cases of State adoption, the words "such areas as may be designated by the State department of health."

[2] Emergency Sanitation Standards for Raw Milk for Pasteurization were approved by the U. S. Public Health Service Sanitation Advisory Board on December 4, 1942, and are recommended by the U. S. Public Health Service as a basis for the acceptance of interstate shipments of milk for pasteurization during the war emergency by areas experiencing milk shortages. The Standards are similar to those for grade A raw milk for pasteurization of the Milk Ordinance and Code Recommended by the U. S. Public Health Service (Public Health Bulletin No. 220, 1939 edition) with such modifications as were considered necessary to render them applicable to different climatic conditions and to reduce the use of critical materials.

shall be understood to refer to ....[1] *Provided further*, That in said ordinance all parentheses signs, which enclose words referring to grading, shall be understood to be deleted; *Provided further*, That the provision for production control of ingredients derived from milk, contained in the footnote to item 25*p* of said ordinance, shall not apply: *Provided further*, That section 8 of said ordinance shall be replaced by section 2 below.

SECTION 2. From and after the date on which these Standards take effect no mix or frozen dessert shall be sold for ultimate consumption within the jurisdiction of these Standards unless it has been manufactured and frozen in a plant conforming with the grade A requirements of said code: *Provided*, That when any frozen desserts plant fails to qualify for grade A, the State or local health officer having jurisdiction is authorized to revoke the permit or, in lieu thereof, to degrade the plant and permit its operation during a temporary period not exceeding 30 days, or in emergencies such longer periods as he may deem necessary.

Part V

EATING AND DRINKING ESTABLISHMENTS

SECTION 1. The inspection, grading, regrading, and placarding of eating and drinking establishments, the issuing and revocation of permits for the operation of such establishments, the sale of adulterated, misbranded, or unwholesome food and drink, and the enforcement of these Standards shall be regulated in accordance with the terms of the unabridged form of the 1943 edition of the Ordinance Regulating Eating and Drinking Establishments Recommended by the U. S. Public Health Service, a certified copy of which shall be on file in the office of the (...................): *Provided*, That the words "city of ...." in said Public Health Service ordinance shall be understood to refer to ....[1]: *Provided further*, That in said ordinance all parentheses signs, which enclose words referring to grading, shall be understood to be deleted: *Provided further*, That the term "approved sources" in section 6, item 14, second sentence, shall be taken to mean exclusively grade A pasteurized milk and milk products, and ice cream and other frozen desserts manufactured in grade A frozen desserts plants: *Provided further*, That the term "approved sources" in section 6, item 14, last sentence, shall be taken to mean shellfish shippers who have been certified by the State authorities, or whose names appear upon the current list issued by the U. S. Public Health Service: *Provided further*, That section 7 of said ordinance shall be replaced by section 2 below.

[1] Insert name of community, or in cases of State adoption, the words "such areas as may be designated by the State department of health."

SECTION 2. From and after the date on which these Standards take effect no restaurants shall be operated within the jurisdiction of these Standards, except grade A restaurants or approved itinerant restaurants: *Provided,* That when any restaurant fails to comply with this requirement the State or local health officer having jurisdiction is authorized to revoke the permit or, in lieu thereof, to degrade the restaurant and permit its operation during a temporary period not exceeding 30 days, or in emergencies such longer period as he may deem necessary.

Part VI

SWIMMING POOLS AND BATHING PLACES

SECTION 1. All swimming pools and bathing places which are hereafter constructed or extensively reconstructed, or which, in the opinion of the State or local health officer having jurisdiction, require reconstruction, shall conform in their construction or reconstruction and in their operation and maintenance with the recommendations of the 1940 report of the Joint Committee on Bathing Places of the Conference of State Sanitary Engineers and the Engineering Section of the American Public Health Association, a certified copy of which shall be on file in the office of the (____________________________). This report is entitled: "Design, Equipment, and Operation of Swimming Pools and other Public Bathing Places" and is published by the American Public Health Association. All existing pools and bathing places which in the opinion of the State or local health officer having jurisdiction require no extensive reconstruction shall conform in their operation and maintenance with the above recommendations.

Part VII

REFUSE—GARBAGE—RUBBISH—ASHES

SECTION 1. *Definitions.*

Item 1. *Refuse.*—The term "refuse" shall include garbage, rubbish, ashes, and all other putrescible and nonputrescible wastes except sewage, from all public and private establishments and residences.

Item 2. *Garbage.*—The term "garbage" shall include all putrescible wastes, except sewage and body wastes, including vegetable and animal offal and carcasses of dead animals, but excluding recognized industrial byproducts, and shall include all such substances from all public and private establishments and from all residences.

Item 3. *Rubbish.*—The term "rubbish" shall include all nonputrescible wastes, except ashes, from all public and private establishments and from all restaurants.

Item 4. *Ashes.*—The term "ashes" shall include the waste products of coal and other fuels used for heating and cooking from all public and private establishments and from all residences.

SECTION 2. *Accumulation of garbage.*—No owner or lessee of any public or private premises shall permit to accumulate upon his premises any garbage except in covered containers approved by the health officer. Such containers shall be constructed in such manner as to be strong, not easily corrodible, rodentproof, insectproof, and shall be kept covered at all times except when garbage is being deposited therein or removed therefrom.

SECTION 3. *Collection of garbage and other refuse.*

Item 1. *Collection interval.*—All garbage and other refuse shall be collected sufficiently frequently to prevent nuisance, but at least once in -------------- days.

Item 2. *Permits.*—No person, firm, or corporation shall collect garbage or other refuse who does not possess a permit from the health officer having jurisdiction. Said permit shall be issued only upon the payment of an annual permit fee of $-------------- per collecting vehicle and only after said health officer has satisfied himself that the licensee is capable of complying with the requirements of these Standards; the permit may be revoked by the health officer when he deems such action is necessary for the protection of the public health.

Item 3. *Type of collection vehicles.*—The collection of garbage and other refuse shall be by means of covered vehicles approved by the health officer having jurisdiction.

SECTION 4. *Disposal of garbage and other refuse.*—All disposal and salvaging of garbage and other refuse shall be by a method ormethods specifically approved by the State department of health: *Provided,* That said method or methods shall include the maximum practicable rodent, insect, and nuisance control at the place or places of disposal: *Provided further,* That no garbage shall be fed to hogs unless said garbage has first been heated to at least 212° F. and held there at least 30 minutes in apparatus and by methods approved by the State health officer: *Provided further,* That animal offal and carcasses of dead animals shall be buried or cremated as directed by the health officer or other authority having jurisdiction, or shall be rendered at 40 pounds per square inch steam pressure or higher, or heated by equivalent cooking.

SECTION 5. (OPTIONAL) *Service charge and noncollection.*[1]

Item 1. *Rates for garbage service.*—There shall be charged, assessed, and collected from each residential unit within the city limits the monthly amount of $-------------- and from each business establishment within said city limits the amount of $--------------. The city secretary or clerk shall collect these fees either through the water department as a separate item on each water bill or by any other practicable means of collection.

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[1] Suggested for use by municipalities.

Item 2. *Uncollected garbage declared a nuisance.*—No garbage or refuse shall be collected from any premises where the owner or lessee is in arrears for a period of 1 month. Fermenting, putrefying, or odoriferous garbage in containers, uncollected due to failure to pay garbage fees, shall be declared a nuisance.

Part VIII

THE SANITATION OF HABITABLE BUILDINGS

SECTION 1. *Definitions.*—The following definitions shall apply in the interpretation of the sections and items of part VIII, The Sanitation of Habitable Buildings:

Habitable building means a building containing rooms designed or occupied as the sleeping quarters for one or more persons.

Habitable room means a room occupied by one or more persons for sleeping, living, eating, or cooking, and includes a kitchen serving a dwelling unit, but does not include bathrooms, toilet compartments, closets, pantries, store rooms, or hallways.

A dwelling unit consists of one or more contiguous habitable rooms used for sleeping, living, cooking, and eating purposes by one or more persons forming a single household.

Free floor area is floor space not covered by beds, bureaus, clothes chests, lavatories, and other bulky or permanent fixtures or their horizontal projections.

Conversion means a change which results in the residential use of an existing structure; it includes alteration of or addition to the original structure which results in the formation of new habitable rooms or dwelling units.

SECTION 2. *Water supply.*—Water supply under pressure and complying with the requirements of part I of these Standards must be provided in each dwelling unit of every habitable building hereafter constructed or converted.

The water supplied to any habitable building must be drawn from an approved public source whenever available.

SECTION 3. *Plumbing.*—All plumbing in habitable buildings shall be designed to prevent the contamination within the structure of potable water and foodstuffs. It shall comply with the requirements of The Plumbing Manual, National Bureau of Standards Report B. M. S. 66, November 1940, or its equivalent in the opinion of the State department of health, or as otherwise provided by law. During the war emergency, the Emergency Plumbing Standards for Defense Housing (issued by the Division of Defense Housing Coordination, Office for Emergency Management, Washington, D. C., 1942)[1] shall be adhered to insofar as use of substitute materials in place of critical materials such as copper, brass, and other critical items is concerned.

[1] A copy will be furnished upon request to the Surgeon General, U. S. Public Health Service.

At least one water closet, bathtub, or shower bath, lavatory, and kitchen sink supplied by water under pressure must be installed in each dwelling unit of every habitable building hereafter constructed or converted.

In buildings used as dormitories the following minimum numbers of fixtures shall be provided:

1 water closet for every 10 men or 8 women.
1 lavatory for every 6 persons.
1 urinal closet for every 25 men.
1 bath tub for every 40 men or 35 women.
1 shower head for every 8 men or 10 women.
1 laundry tray for every 40 men or 35 women.
1 drinking fountain for every 50 persons.
1 slop sink for every utility room.

The house sewer of every habitable building must be connected with a public sewerage system whenever one is available within 300 feet in a street or alley abutting the property and accessible by gravity flow.

SECTION 4. *Heating and ventilation.*[2]—Every habitable building shall be equipped with heating equipment capable of maintaining every habitable room thereof at a temperature of at least 70° F. whenever occupied unless year-round climatic conditions make such equipment unnecessary in the opinion of the State health officer.

In every habitable building windows opening to the outside air must be provided for ventilating all rooms except closets. The openable window area for ventilation purposes shall be at least 2½ percent of the floor area for existing buildings and 5 percent for habitable buildings hereafter constructed or converted: *Provided,* That mechanical ventilating systems may be substituted for or supplement natural ventilation using openable windows. When such mechanical ventilating systems are to be used, plans therefor shall be approved by the health officer having jurisdiction.

Openable windows, trapdoors, louvers, or their equivalent, having a clear openable area equal to at least 2 percent of the floor area, must be provided for all attics, basements, and cellars.

All heating appliances producing dangerous gases must be vented adequately to the outside and must have tight flue connections.

Water closets, urinals, bathtubs, and shower baths must be located in rooms separated from habitable rooms by floor-to-ceiling partitions and doors. Any rooms containing a water closet or urinal must have at least 10 square feet of free floor area and at least 100 cubic feet of air space for each water closet and each urinal.

SECTION 5. *Lighting.*—In every habitable building hereafter constructed or converted, every habitable room must be arranged so that

[2] Health officers shall be governed by the current Guide of the American Society of Heating and Ventilating Engineers in ascertaining compliance with the provisions of this section of the Standards (published by American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York City).

at noon on a clear winter day there will be natural illumination of a minimum intensity of 6 foot candles at the darkest point on a plane 30 inches above the floor, provided that measurements are taken at a time when the room is unfurnished.

There must be at all times a minimum of 2½ foot candles of illumination as measured on the floor or tread of all public hallways, stairways, and other passageways.

There must be available at all times in every compartment housing a water closet or urinal a minimum of 5 foot candles of illumination measured on a plane 30 inches above the floor.

SECTION 6. *Space requirements.*—No habitable room for single occupancy shall have less than 40 square feet of free floor area, all of which shall have a minimum ceiling height of 7 feet.

No habitable room for double occupancy shall have less than 60 square feet of free floor area, all of which shall have a minimum ceiling height of 7 feet, and in no case shall there be less than 400 cubic feet per person.

SECTION 7. *Insect and rodent control.*—Every habitable building which is located in an area in which flies and mosquitoes have not otherwise been effectively controlled must have all openings to the outside equipped with screens of not less than 16 meshes to the inch, which are so maintained as to prevent effectively the entrance into the building of flies and mosquitoes: *Provided*, That all outside screen doors shall open outward and be self-closing: *Provided further*, That effective means other than screens may be substituted therefor when specifically approved by the health officer having jurisdiction.

Every habitable building hereafter constructed or converted shall be designed to be, and must be kept, ratproof.[3]

All enclosed spaces within double walls, between ceilings and floors, or beneath floors, which provide harborage and potential breeding places for rodents shall be either (*a*) eliminated by removal of the sheathing or interior walls which form the enclosed spaces, or (*b*) all exposed edges of such walls, floors, and sheathing shall be protected by the installation of approved ratproof material. All openings in walls, floors, and ceilings through which pipes, electric cables, and other conduits pass shall be sealed properly with snugly fitting collars of metal or other approved material securely fastened in place and so maintained. Propagation of rats and invasion and infestation of the premises by them shall be prevented permanently.

For temporary war housing built under the auspices of the Federal Public Housing Authority, the ratproofing requirements of that agency shall apply in lieu of these requirements.

[3] A copy of model specifications for use in connection with the enactment of the ratproofing part of this section will be furnished upon request to the Surgeon General, U. S. Public Health Service.

SECTION 8. *Compliance.*—The following classes of habitable buildings must comply with the requirements of part VIII of these Standards: (*a*) Every existing habitable building which is occupied in whole or in part by a person or persons paying rent; (*b*) every habitable building hereafter constructed or converted.

All improvements specifically required in habitable buildings erected before these Standards went into effect must be made within a period of time to be specified by the health officer. The owner is responsible for compliance with these requirements.

SECTION 9. *Exercise of police power.*—If, in the opinion of the health officer having jurisdiction, any building used for human habitation is a menace to the physical, mental, or moral health of the occupants or the community, he may order the owner (*a*) to repair the building so as to make it comply with part VIII of these Standards; (*b*) to prevent its further use in violation of this section of part VIII of these Standards; or (*c*) to demolish it.

SECTION 10. *Enforcement.*—This part of the Standards shall be enforced by the State or local health officer having jurisdiction.

SECTION 11. *Separability.*—If, for any reason, any section or clause of part VIII of these Standards shall be declared invalid, the remainder shall not be affected thereby.

Part IX

TOURIST CAMPS, TRAILER CAMPS, CABIN CAMPS, CONSTRUCTION CAMPS, AND SIMILAR ESTABLISHMENTS

SECTION 1. All tourist camps, trailer camps, cabin camps, construction camps, and similar establishments shall comply with the following requirements:

Item 1. *Water supply.*—There shall be provided at each such establishment a water supply which complies with the requirements of part I of these Standards entitled "Water supplies."

Item 2. *Excreta and sewage.*—There shall be provided at each such establishment a method of excreta disposal which complies with the requirements of part II of these Standards entitled "Sewage and industrial wastes and excreta disposal."

Item 3. *Refuse.*—Every such establishment shall comply with the requirements of part VII of these Standards entitled "Refuse—garbage—rubbish—ashes."

Item 4. *Heating, lighting, ventilation, plumbing, screening, and overcrowding.*—All cabins and other inhabited buildings located upon the premises of such establishments shall comply with the requirements of part VIII of these Standards entitled "The sanitation of habitable buildings," insofar as they are reasonably applicable.

Item 5. At least one competent caretaker shall be responsible for the supervision of the camp and shall make necessary routine inspections

and exercise all duties necessary in the maintenance of the camp in accordance with the requirements of these Standards.

Item 6. It shall be the duty of all camp owners or managers, or other persons knowing or suspecting the presence of persons in the camp afflicted with any communicable disease, to report said condition immediately to the health officer having jurisdiction.

SECTION 2. *Recommended trailer camp rules and regulations.*[1]

Item 1. *Definitions.*—A trailer camp is herein defined as any tract or parcel of land, maintained, offered, or used for the parking or camping of house trailers, house cars, or similar portable units of habitation.

A house trailer is herein defined as any house car, house trailer, trailer home, or similar mobile unit which may be used for semipermanent or temporary living quarters.

Item 2. *Supervision.*—Every trailer camp shall have at least one competent attendant or caretaker whose duty it shall be to maintain the camp, its facilities, and its equipment in a clean, orderly, and sanitary condition. He shall also keep a record of all house trailers parked in the camp under his supervision including the name and address of the owner, the license number and State of origin of cars and house trailers, and the number of occupants of each unit.

Item 3. *Location and space.*—No trailer camp shall be so located that the drainage of the camp area will endanger any water supply. All camps shall be well drained and located in areas free from ponds, swamps, and similar places in which mosquitoes may breed.

Each car and house trailer shall together be allotted a space of not less than 700 square feet. Each unit shall abut or face on a driveway or clear unoccupied space of not less than 20 feet in width, which space shall have unobstructed access to a public street or alley. There shall be a space of at least 10 feet between every house trailer and any other house trailer, building, or other structure.

Item 4. *Water supplies.*—An adequate supply of safe water under pressure shall be provided in all parts of every trailer camp. At least one water supply outlet shall be provided for every two-house trailer unit and in no case shall a house trailer site be more than 100 feet from a water-supply outlet.

Special hoses shall be kept for the filling of water tanks on house trailers and shall be stored off of the ground under sanitary conditions when not in use. These hoses shall be used for no other purpose than the watering of house trailers and shall be so handled and used that they may not cause contamination of water either in house trailer tanks or in the water-supply system.

[1] The provisions of this section, excepting for minor modifications, are those given in a report by the Joint Committee on Summer Camps and Roadside Places, Conference of State Sanitary Engineers and Public Health Engineering Section, American Public Health Association, 1937.

The dipping of water from open springs, wells, streams, or lakes for water-supply purposes is prohibited.

Item 5. *Toilet, bathing, and laundry facilities.*—All plumbing in trailer camps shall comply with the requirements of part I, section 8, item 1, of these Standards.

Water-flush toilet facilities shall be provided in conveniently located, well-constructed buildings having good natural and artificial lighting, adequate ventilation, and floors of concrete or similar impervious material. Concrete curbings extending at least 6 inches above the floor shall be provided and the floor sloped to adequate drains. The interior walls and ceilings of such buildings shall be of smooth material painted with a light-colored paint.

Separate toilet facilities marked by appropriate signs shall be provided for males and females, at least 1 for each 15 persons or fraction thereof. At least 1 urinal shall be provided in each toilet building for males.

Toilet buildings shall be located so as to be within 200 feet of all house trailer camping spaces.

One lavatory shall be provided for every three toilets or toilets and urinals.

Separate showers with hot and cold water shall be provided for both males and females and the buildings containing them shall comply with the requirements of the second paragraph of this item. One shower head shall be provided for each 20 house trailers or fraction thereof. Wooden or cloth mats, grids, boards, or walkways are prohibited.

All floors in shower and toilet rooms shall be disinfected daily by the use of chlorine compounds or other materials in strengths approved by the State department of health.

A laundry room or building constructed as specified in the second paragraph of this item shall be provided with laundry trays and hot and cold running water.

Item 6. *Slop sinks.*—Slop sinks properly trapped and vented shall be provided in convenient locations, at least one within 200 feet of each house trailer camping space. All slop sinks shall be equipped with water faucets which shall be protected from backsiphonage. Slop sinks shall be so constructed and installed that they may be used for the cleaning of both cans and slop jars.

Item 7. *Disposal of sewage and other water-carried wastes.*—All sewage and other water-carried wastes shall be disposed of into a municipal sewer system wherever possible. In camps in which city sewer connections are not available, disposal shall be into a private system which includes a sanitary means of disposal, the operation of which creates neither a nuisance nor a menace to health, and which is approved by the State department of health.

A sewer connection shall be made available at each house trailer camping site for connection to the combined liquid waste outlet of the trailer. The type of connection used shall conform to all State and municipal plumbing code requirements and the rules and regulations of the State department of health.

No water-flush toilets may be used in trailers unless connected to the sewerage system in accordance with State and municipal plumbing code requirements and the rules and regulations of the State department of health.

Facilities shall be provided at each house trailer camp for draining the contents of chemical toilets and sewage storage tanks. Such facilities shall have concrete or equally impervious floors and shall be adequately screened against flies and other insects. The management shall provide for the thorough cleaning of those facilities at least once daily and oftener whenever necessary to maintain them in a clean, sanitary condition.

Wastes from sinks and refrigerators may be discharged into covered, metal receptacles and disposed of into slop sinks without being discharged on the surface of the ground unless specific approval for such surface discharge is obtained from the State department of health.

Item 8. *Garbage and refuse collection and disposal.*—Fly-tight metal containers shall be provided for the deposition of garbage and refuse, at least one for every two trailers; one for each trailer is recommended. At least one depository shall be located within 100 feet of each trailer camping site.

Garbage cans shall be emptied at least once every two days and shall not be allowed to become foul-smelling or breeding places for flies.

Garbage and refuse shall be disposed of in a manner approved by the State department of health.

Item 9. *Miscellaneous laws and regulations.*—In addition to the requirements set forth in these Standards, all house trailer camps and facilities shall be established and constructed in compliance will all existing State and local statutes, ordinances, codes, and regulations.

DENGUE FEVER IN HONOLULU

An outbreak of dengue fever was reported in Honolulu, Territory of Hawaii, during the latter part of July 1943, with about 40 cases, occurring in widely separated areas of the city, being reported up to August 11. Intensive mosquito eradication measures were immediately instituted, and by October 31 there were 147 persons engaged in field activities, including 52 Public Health Service employees. The Army and the Honolulu Chamber of Commerce have cooperated

in the control measures, which consist of inspection to determine mosquito indexes and breeding places, spraying, epidemiological studies, and educational measures. Epidemiological investigations are being conducted by Dr. J. R. Enright, Director of the Bureau of Communicable Diseases, of the Territorial Board of Health.

Up to December 4, a total of 1,250 cases of dengue fever had been reported in Honolulu. The largest number of cases occurring in any one week up to October 31 was 156 cases for the week ended October 21. According to Passed Assistant Sanitary Engineer (R) Wesley E. Gilbertson, there has been a definite increase in the number of cases among school children since the beginning of the school year. Every schoolroom in schools located in areas having the highest incidence has been sprayed twice daily.

There is stated to be a wide range in the severity of the disease, from very mild ambulatory cases to extremely severe bedridden cases, with delirium and mental disturbances. The mental and physical depression usually following attacks of the disease has been observed, but no other sequelae have been in evidence, with the exception of one patient who reported poor vision following the attack. To date, only one fatal case has been reported.

Mr. Gilbertson points out that previous outbreaks of dengue fever occurred in the Territory of Hawaii in 1903 and 1912. A uniform system of reporting communicable diseases had not been established by the Territorial Board of Health at the time of the 1903 outbreak, but Government physicians on some of the islands stated in their monthly reports that dengue was severe and widespread during that year. Cases were stated to have been occurring in Honolulu at the rate of about 10 new infections a day. It was also noted that the disease was similar to a fever reported prevalent 10 years previously, principally among the natives, and known as "Boohoo fever." The first mosquito campaign in Honolulu was inaugurated in 1904, according to the report of the Sanitary Commission (1912) created by an act of the territorial legislature in 1911. The implication regarding the role of mosquitoes in disease transmission was becoming more widely known about that time.

According to official records of the Territorial Board of Health there were 108 cases of dengue fever recorded in the Territory during the year ended June 30, 1912, of which 85 occurred in Honolulu. In view of the statements, however, made by local residents who were living there at that time, the incidence was probably very much higher. Reports of the Board of Health show that there were 3 cases of dengue reported during the next year and 11 cases during the next succeeding year. One case was reported in 1924.

It has been stated[1] that mosquitoes were first introduced into Hawaii in 1826, at Lahaina, Island of Maui, by a vessel arriving from San Blas, Mexico. These were *Culex quinquefasciatus*. It is said that there was no Hawaiian word for mosquito prior to that year, and that in 1903 the word "makika" was used to identify this pest. Apparently the *Culex* spread somewhat slowly for some time after its introduction to the Islands. In 1850 some areas about 50 miles from Lahaina were still mosquito-free, probably because of the intervening mountain range.

DEATHS DURING WEEK ENDED NOVEMBER 27, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 27, 1943	Corresponding week, 1942
Data for 89 large cities of the United States:		
Total deaths	8,621	8,500
Average for 3 prior years	8,413	
Total deaths, first 47 weeks of year	420,939	393,088
Deaths under 1 year of age	602	603
Average for 3 prior years	576	
Deaths under 1 year of age, first 47 weeks of year	30,060	27,165
Data from industrial insurance companies:		
Policies in force	66,063,813	65,271,636
Number of death claims	9,571	9,820
Death claims per 1,000 policies in force, annual rate	7.6	7.8
Death claims per 1,000 policies, first 47 weeks of year, annual rate	9.6	9.1

[1] D. L. Van Dyne, entomologist, Honolulu Advertiser, August 19, 1904.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 4, 1943

Summary

A total of 4,489 cases of influenza was reported, as compared with 2,465 for the preceding week, 1,734 for the next earlier week, and a 5-year (1938–42) median of 2,478. The largest increases occurred in the South Atlantic, South Central, and Mountain areas. Of the current total, 3,940 cases, or 88 percent, were reported in 10 States, as follows (last week's figures in parentheses): Minnesota 273 (270), Virginia 651 (259), South Carolina 453 (331), Georgia 105 (30), Tennessee 155 (56), Alabama 270 (54), Arkansas 184 (89), Texas 1,298 (807), Colorado 238 (12), and Arizona 313 (155). The next largest number reported was 88 cases, in Nebraska. For the fourth quarter of the year to date 17,072 cases have been reported, as compared with 13,649 for the same period last year and a 5-year average of 12,054.

The incidence of meningococcus meningitis increased in all geographic areas except the west central. A total of 274 cases was reported for the country as a whole, as compared with 195 last week, 265 for the next earlier week, and 40 for the 5-year median. States reporting 12 or more cases (last week's figures in parentheses) are as follows: Massachusetts 13 (11), Connecticut 12 (6), New York (New York City, 22) 31 (24), Pennsylvania 33 (16), Illinois 14 (10), Michigan 23 (8), and California 25 (20). The cumulative total reported to date for the fourth quarter of the current year is 2,003, as compared with 613 for the same period last year and a 5-year median of 296.

A further reduction was recorded in the incidence of poliomyelitis for the country as a whole, but increases occurred in the Middle Atlantic, North Central, and Mountain areas. The total reported for the week was 141 cases, as compared with 150 last week, an average of 218 for the past 4 weeks, and a 5-year median of 112. The cumulative total for the first 9 weeks of the fourth quarter of the year is 2,814, as compared with 1,146 for the same period last year and a 5-year average of 1,822. States reporting the largest numbers

currently are California (29), Oregon (14), Utah (12), and New York (11).

Totals above the corresponding 5-year medians are also reported currently for measles and scarlet fever, while those of diphtheria, smallpox, typhoid fever, and whooping cough continue below the medians.

Deaths recorded in 87 large cities of the United States for the week totaled 9,565, as compared with 8,450 last week and a 3-year (1940–42) average of 8,742. The cumulative total for the year to date is 422,607, as compared with 395,054 for the corresponding period of last year.

Telegraphic morbidity reports from State health officers for the week ended December 4, 1943, and comparison with corresponding week of 1942, and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Dec. 4, 1943	Dec. 5, 1942		Dec. 4, 1943	Dec. 5, 1942		Dec. 4, 1943	Dec. 5, 1942		Dec. 4, 1943	Dec. 5, 1942	
NEW ENGLAND												
Maine	1	0	0	1	------	3	132	1	88	3	2	0
New Hampshire	0	0	0	------	------	------	0	101	3	0	0	0
Vermont	0	0	0	------	------	------	0	157	19	0	0	0
Massachusetts	5	3	4	------	------	------	258	370	225	13	5	1
Rhode Island	0	2	1	1	1	------	66	1	1	5	8	0
Connecticut	0	0	1	52	8	3	9	201	73	12	1	1
MIDDLE ATLANTIC												
New York	10	18	18	[1] 14	[1] 11	[1] 4	352	227	373	31	15	5
New Jersey	1	5	11	17	14	13	366	31	22	10	5	2
Pennsylvania	8	23	23	5	6	------	242	760	289	33	7	5
EAST NORTH CENTRAL												
Ohio	17	24	24	1	9	13	417	22	25	9	8	1
Indiana	11	9	21	59	16	16	157	44	19	2	0	1
Illinois	7	24	42	18	8	10	132	31	31	14	3	2
Michigan [2]	9	10	12	7	1	1	465	56	133	23	0	0
Wisconsin	0	0	0	37	16	17	326	128	125	4	0	0
WEST NORTH CENTRAL												
Minnesota	15	9	3	273	2	1	603	7	61	2	0	0
Iowa	2	2	5	------	------	------	70	21	24	4	0	0
Missouri	5	4	10	21	5	2	9	6	9	5	3	0
North Dakota	2	0	2	23	16	16	187	1	1	0	0	0
South Dakota	2	12	6	------	------	------	59	29	6	1	0	0
Nebraska	12	7	4	88	5	------	7	59	2	0	0	0
Kansas	9	15	7	31	2	5	17	27	21	2	0	0
SOUTH ATLANTIC												
Delaware	1	0	0	------	------	------	15	3	8	1	0	0
Maryland [3]	7	6	6	6	15	5	24	8	8	8	4	1
District of Columbia	0	1	1	4	2	1	13	4	2	2	1	0
Virginia	9	23	32	651	187	145	388	13	13	8	7	2
West Virginia	7	10	10	1	14	8	228	4	4	4	0	1
North Carolina	20	37	63	1	3	3	99	5	136	3	0	1
South Carolina	7	16	16	453	322	322	26	3	7	2	0	0
Georgia	14	10	19	105	14	40	32	0	10	5	1	1
Florida	4	4	4	6	2	2	16	1	2	7	1	1
EAST SOUTH CENTRAL												
Kentucky	10	9	14	3	3	12	8	87	76	3	2	2
Tennessee	11	4	13	155	29	40	35	8	11	8	1	1
Alabama	11	16	29	270	58	58	109	5	19	3	1	1
Mississippi [3]	8	10	11	------	------	------	------	------	------	1	0	0
WEST SOUTH CENTRAL												
Arkansas	4	14	16	184	73	73	36	8	9	1	0	0
Louisiana	10	6	17	35	5	5	1	3	2	1	2	0
Oklahoma	6	17	21	29	60	87	2	3	3	3	0	0
Texas	50	45	53	1,298	769	359	66	16	17	4	3	1
MOUNTAIN												
Montana	1	2	2	2	------	8	112	15	15	2	0	0
Idaho	0	1	2	2	1	1	8	143	10	0	0	0
Wyoming	0	0	0	2	76	4	13	27	3	0	0	0
Colorado	4	10	10	238	50	33	84	10	41	3	1	1
New Mexico	1	2	2	21	1	2	4	4	3	1	2	1
Arizona	4	6	6	313	68	121	11	1	2	0	0	0
Utah [3]	0	7	0	1	3	9	8	362	62	0	1	0
Nevada	1	0	0	------	2	------	4	33	0	0	1	0
PACIFIC												
Washington	1	8	8	6	------	------	39	425	52	4	2	0
Oregon	7	1	3	4	29	24	78	235	28	2	2	1
California	33	29	29	51	22	63	101	61	160	25	4	1
Total	347	461	545	4,489	1,928	2,478	5,434	3,717	3,539	274	88	40
48 weeks	12,648	14,312	15,090	102,897	98,419	165,468	572,427	487,003	487,003	16,530	8,284	1,880

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 4, 1943, and comparison with corresponding week of 1942, and 5-year median—Con.

Division and State	Poliomyelitis: Week ended— Dec. 4, 1943	Poliomyelitis: Week ended— Dec. 5, 1942	Poliomyelitis: Median 1938–42	Scarlet fever: Week ended— Dec. 4, 1943	Scarlet fever: Week ended— Dec. 5, 1942	Scarlet fever: Median 1938–42	Smallpox: Week ended— Dec. 4, 1943	Smallpox: Week ended— Dec. 5, 1942	Smallpox: Median 1938–42	Typhoid and paratyphoid fever [3]: Week ended— Dec. 4, 1943	Typhoid and paratyphoid fever [3]: Week ended— Dec. 5, 1942	Typhoid and paratyphoid fever [3]: Median 1938–42
NEW ENGLAND												
Maine	0	1	0	23	1	12	0	0	0	1	1	0
New Hampshire	1	0	0	8	7	7	0	0	0	0	0	0
Vermont	1	1	0	0	1	4	0	0	0	1	0	0
Massachusetts	3	0	0	166	285	124	0	0	0	0	1	1
Rhode Island	0	0	0	6	7	6	0	0	0	1	1	0
Connecticut	4	0	0	45	39	37	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	11	7	7	298	225	230	0	0	0	10	5	8
New Jersey	1	8	2	81	65	101	0	0	0	0	2	2
Pennsylvania	4	8	3	200	162	196	0	0	0	4	3	7
EAST NORTH CENTRAL												
Ohio	4	2	3	320	238	240	0	0	2	3	4	4
Indiana	0	1	1	71	43	100	2	7	4	1	1	2
Illinois	9	3	3	176	217	292	1	1	1	3	1	4
Michigan [2]	5	1	1	139	91	231	2	0	4	4	2	2
Wisconsin	9	1	1	149	135	151	1	0	2	0	0	0
WEST NORTH CENTRAL												
Minnesota	0	1	1	84	73	73	0	0	9	0	0	0
Iowa	1	0	1	71	48	65	0	1	1	0	1	1
Missouri	6	0	1	43	54	66	0	1	5	0	3	4
North Dakota	0	0	0	7	10	14	0	0	0	1	0	0
South Dakota	1	1	0	29	29	29	0	0	0	0	0	0
Nebraska	1	3	2	28	15	15	2	0	0	0	2	0
Kansas	2	3	1	128	53	76	1	4	1	2	1	1
SOUTH ATLANTIC												
Delaware	0	0	0	1	17	21	0	0	0	0	0	0
Maryland [3]	0	0	0	58	36	50	0	0	0	1	3	5
District of Columbia	0	0	1	25	33	18	0	0	0	0	1	1
Virginia	0	1	1	49	58	54	0	0	0	1	3	6
West Virginia	0	0	1	77	46	64	0	0	0	0	1	3
North Carolina	0	1	0	132	111	101	0	0	0	0	0	1
South Carolina	0	0	0	11	6	13	1	0	0	0	0	0
Georgia	0	0	1	29	43	38	0	0	0	1	3	5
Florida	0	0	0	6	13	5	0	0	0	2	2	1
EAST SOUTH CENTRAL												
Kentucky	1	1	3	47	62	78	0	1	0	1	0	4
Tennessee	0	0	1	77	58	61	0	0	0	1	3	3
Alabama	1	1	2	17	44	39	0	0	0	1	1	1
Mississippi [3]	0	1	2	16	14	13	0	1	0	3	3	3
WEST SOUTH CENTRAL												
Arkansas	0	0	1	6	14	18	0	2	2	3	3	4
Louisiana	2	0	0	15	19	19	0	0	0	1	8	8
Oklahoma	4	0	0	10	20	24	0	0	0	1	4	4
Texas	6	19	3	52	40	58	3	0	0	2	5	8
MOUNTAIN												
Montana	0	0	0	28	10	20	0	0	0	0	2	1
Idaho	0	0	0	22	8	12	0	0	0	4	0	0
Wyoming	1	0	0	3	2	8	0	0	0	0	0	0
Colorado	3	0	0	25	25	25	1	0	6	1	4	3
New Mexico	1	1	0	10	17	15	0	0	0	1	2	3
Arizona	1	1	0	16	6	4	0	0	0	0	1	1
Utah [2]	12	3	0	45	27	24	0	0	0	7	1	0
Nevada	0	0	0	1	0	0	0	0	0	0	0	0
PACIFIC												
Washington	3	0	0	115	27	39	0	0	0	1	0	3
Oregon	14	1	0	52	10	17	0	0	1	1	0	1
California	29	18	8	227	153	153	0	0	0	3	5	3
Total	141	79	112	3,244	2,717	2,903	14	18	39	67	78	121
48 weeks	12,134	3,981	7,029	128,170	115,871	143,545	701	737	2,242	5,222	6,452	9,159

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 4, 1943, and comparison with corresponding week of 1942, and 5-year median—Con.

Division and State	Whooping cough: Week ended— Dec. 4, 1943	Whooping cough: Week ended— Dec. 5, 1942	Whooping cough: Median 1938–42	Week ended December 4, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	21	73	49	0	0	0	0	0	0	0	0	0
New Hampshire	2	19	5	0	0	0	0	0	0	0	0	0
Vermont	43	46	46	0	0	0	0	0	0	0	0	0
Massachusetts	138	258	207	0	0	0	2	0	0	0	0	0
Rhode Island	19	39	30	0	0	0	0	0	0	0	0	0
Connecticut	35	107	77	0	0	3	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	283	436	562	0	2	24	0	2	0	0	0	1
New Jersey	100	270	214	0	7	1	0	0	0	0	0	0
Pennsylvania	137	371	382	0	1	0	0	1	0	0	1	0
EAST NORTH CENTRAL												
Ohio	78	183	183	0	0	0	0	0	0	0	1	0
Indiana	35	15	19	0	0	0	0	0	0	0	1	0
Illinois	103	195	220	0	1	2	0	0	0	0	0	0
Michigan [2]	142	250	308	0	1	14	0	1	0	0	0	0
Wisconsin	117	195	195	0	0	0	0	1	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	72	47	49	0	0	0	0	1	0	0	0	0
Iowa	21	31	26	0	0	0	0	0	0	0	0	0
Missouri	16	12	15	0	0	0	0	0	0	0	1	0
North Dakota	2	19	19	0	0	0	0	1	0	0	0	0
South Dakota	7	7	2	0	0	0	0	0	0	0	0	0
Nebraska	9	6	4	0	0	0	0	0	0	0	0	0
Kansas	28	29	29	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	3	6	12	0	0	0	0	0	0	0	0	0
Maryland [2]	35	109	70	0	0	0	1	2	0	0	1	0
Dist. of Col.	4	13	19	0	0	0	0	0	0	0	0	0
Virginia	82	34	58	0	0	0	[4] 48	0	0	0	1	0
West Virginia	29	33	18	0	0	0	0	0	0	0	0	0
North Carolina	200	55	136	0	0	0	0	0	0	0	0	20
South Carolina	43	13	24	0	0	2	0	0	0	0	0	6
Georgia	16	15	15	0	0	10	0	0	0	0	1	33
Florida	11	18	4	0	4	1	0	0	0	0	0	3
EAST SOUTH CENTRAL												
Kentucky	79	17	57	0	0	2	0	0	0	0	0	0
Tennessee	59	42	42	0	0	0	1	0	0	0	1	0
Alabama	9	31	13	0	0	0	0	0	0	0	1	33
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	4
WEST SOUTH CENTRAL												
Arkansas	9	22	20	0	0	9	0	0	0	0	2	0
Louisiana	11	3	6	0	0	1	0	0	1	0	0	3
Oklahoma	0	5	5	0	0	0	0	0	0	0	0	0
Texas	156	173	69	0	4	500	0	1	0	0	0	20
MOUNTAIN												
Montana	15	20	9	0	0	0	0	0	0	0	0	0
Idaho	8	5	3	0	0	0	0	0	0	0	0	0
Wyoming	4	2	3	0	0	0	0	0	0	0	0	0
Colorado	61	11	17	0	0	0	0	1	0	0	0	0
New Mexico	5	16	18	0	1	0	0	0	0	0	0	0
Arizona	31	9	9	0	0	0	49	0	0	0	0	0
Utah [2]	11	11	20	0	0	0	0	1	0	0	0	0
Nevada	5	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	48	26	41	0	0	0	0	0	0	0	0	0
Oregon	37	8	24	0	0	0	0	0	0	0	0	0
California	97	220	182	0	4	6	0	2	0	0	0	0
Total	2,476	3,525	3,822	0	25	575	[4] 101	14	1	0	11	123
48 weeks	169,180	165,897	165,897	62	1,971	16,377	4,123	647	28	485	728	4,188
48 weeks, 1942	------	------	------	75	1,114	11,647	6,235	540	43	451	807	3,419

[1] New York City only. [2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Maine, 1; Florida, 1; California, 1.
[4] Exclusive of delayed report (included only in cumulative total) of 78 cases in Virginia.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 20, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	11	1	3	0	5	0	0	5
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	2	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	6	1	------	0	3	2	14	1	30	0	1	14
Fall River	0	0	------	0	0	4	1	0	3	0	0	6
Springfield	0	0	------	0	1	0	0	0	4	0	0	2
Rhode Island:												
Providence	0	0	------	0	61	1	2	0	3	0	0	24
Connecticut:												
Bridgeport	1	0	1	0	0	0	1	0	2	0	0	2
New Haven	0	0	------	0	0	0	2	0	2	0	0	3
MIDDLE ATLANTIC												
New York:												
Buffalo	1	0	------	0	2	1	11	0	4	0	0	4
New York	10	0	5	3	149	25	49	6	124	0	4	70
Rochester	0	0	------	0	0	1	4	0	3	0	0	15
Syracuse	0	0	------	0	0	0	3	1	6	0	1	18
New Jersey:												
Camden	0	0	------	0	0	0	1	0	1	0	0	1
Newark	0	0	1	2	4	1	5	0	15	0	0	20
Trenton	0	0	------	0	0	0	3	0	1	0	1	0
Pennsylvania:												
Philadelphia	3	0	3	2	7	15	37	0	24	0	1	26
Pittsburgh	1	0	2	1	108	0	18	0	22	0	2	15
Reading	0	0	------	1	4	1	1	0	1	0	0	3
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0	------	0	0	0	3	1	21	0	0	5
Cleveland	0	0	3	0	12	8	11	2	64	0	0	30
Columbus	1	0	3	3	4	0	3	0	15	0	0	13
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	0	0	0	0
Indianapolis	5	0	------	1	2	2	6	0	21	0	0	13
South Bend	0	0	------	0	24	0	0	0	0	0	0	1
Terre Haute	1	0	------	0	0	0	4	0	1	0	0	0
Illinois:												
Chicago	1	0	2	0	5	8	25	10	42	0	1	60
Springfield	0	0	------	0	0	0	0	0	2	0	0	1
Michigan:												
Detroit	5	0	1	1	6	9	13	0	58	0	0	44
Flint	0	0	------	0	9	0	0	0	1	0	0	7
Grand Rapids	0	0	------	0	2	1	0	0	10	0	0	2
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	3	0	0	0
Milwaukee	0	0	------	0	5	0	0	1	52	0	0	41
Racine	0	0	------	0	1	0	0	0	4	0	0	14
Superior	0	0	------	0	136	0	1	0	0	0	0	5
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	11	0	2	0	3	0	0	18
Minneapolis	9	0	------	1	46	3	7	1	12	0	0	6
St. Paul	0	0	------	0	35	1	1	0	14	0	0	8
Missouri:												
Kansas City	0	0	------	0	1	1	6	0	13	0	0	2
St. Joseph	0	0	------	0	0	0	0	0	2	0	0	1
St. Louis	0	0	1	3	1	4	15	1	4	0	0	20

City reports for week ended Nov. 20, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	7	1	1	0	2	0	0	0
Nebraska:												
Omaha	5	0	------	0	1	0	4	0	7	0	0	1
Kansas:												
Topeka	0	0	------	0	0	0	0	0	4	0	0	8
Wichita	0	0	------	0	4	0	3	0	3	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	3	2	0	0	1	0	0	0
Maryland:												
Baltimore	4	0	1	0	6	7	8	2	15	0	1	25
Cumberland	0	0	1	0	0	0	1	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	1	0	0	0
District of Columbia:												
Washington	1	0	------	0	10	5	15	0	11	0	0	7
Virginia:												
Lynchburg	0	0	------	0	305	0	3	0	0	0	0	16
Richmond	1	0	------	0	13	1	1	0	3	0	0	5
Roanoke	1	0	------	0	0	0	1	0	0	0	0	7
West Virginia:												
Charleston	0	0	------	0	14	0	0	0	8	0	0	0
Wheeling	0	0	------	0	0	0	1	0	1	0	0	0
North Carolina:												
Winston-Salem	0	0	------	0	0	0	0	0	5	0	0	0
South Carolina:												
Charleston	0	0	7	0	3	0	3	0	2	0	0	1
Georgia:												
Atlanta	0	0	1	0	1	0	6	0	2	0	0	1
Brunswick	1	0	------	0	0	0	0	0	1	0	0	0
Savannah	0	0	1	0	0	1	4	0	1	0	0	0
Florida:												
Tampa	1	0	------	0	0	0	3	0	2	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	6	1	0	1	4	0	5	0	0	0
Nashville	1	0	------	0	1	0	3	0	6	0	0	8
Alabama:												
Birmingham	2	0	3	0	5	0	3	0	2	0	0	5
Mobile	0	0	2	1	0	0	1	1	1	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	----	0	0	0	0	1	0	0	0
Louisiana:												
New Orleans	3	0	15	1	1	2	12	1	7	0	1	2
Shreveport	0	0	------	0	0	1	4	0	0	0	0	0
Texas:												
Dallas	5	0	1	1	0	0	1	0	5	0	0	11
Galveston	0	0	------	0	1	0	0	0	0	0	0	0
Houston	3	0	------	0	0	1	9	1	5	0	0	0
San Antonio	0	0	------	0	0	0	11	0	2	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	38	0	3	0	4	0	0	4
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	4	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	3	0	22	0	3	0	5	2	11	0	0	19
Pueblo	0	0	------	0	26	0	1	0	2	0	0	7
Utah:												
Salt Lake City	0	0	------	0	3	1	3	0	8	0	0	0

City reports for week ended Nov. 20, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	2	0	------	0	3	0	3	2	5	0	0	7
Spokane	0	0	------	0	8	1	1	0	13	0	0	11
Tacoma	0	0	------	0	2	0	4	0	7	0	0	0
California:												
Los Angeles	12	0	9	1	6	4	3	5	35	0	0	17
Sacramento	1	0	------	0	0	1	8	1	0	0	1	0
San Francisco	0	0	------	0	0	0	9	5	16	0	0	8
Total	93	1	91	23	1,114	118	395	44	802	0	14	689
Corresponding week, 1942	80	1	101	31	769	24	394	35	853	1	14	1,077
Average, 1938–42	108	------	122	[1] 24	[2] 657	------	[1] 344	------	737	3	25	1,181

Dysentery, amebic.—Cases: Boston, 2; New York, 2; Cleveland, 1; Atlanta, 1; Little Rock, 1; San Francisco, 1.

Dysentery, bacillary.—Cases: Buffalo, 16; New York, 12; Philadelphia, 2; Charleston, S. C., 2; Atlanta, 2; Los Angeles, 3; San Francisco, 1.

Dysentery, unspecified.—Cases: Baltimore, 1; San Antonio, 6.

Leprosy.—Cases: San Francisco, 1.

Typhus fever.—Cases: Atlanta, 8; Savannah, 1; Nashville, 1; Birmingham, 4; Galveston, 1; Houston, 1; Los Angeles, 1.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,308,500)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza Case rates	Influenza Death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
New England	21.1	3.0	3.0	0.0	229.5	24.2	69.5	3.0	154.0	0.0	3.0	169
Middle Atlantic	6.7	0.0	4.9	4.0	122.2	19.6	58.9	3.1	89.6	0.0	4.0	77
East North Central	8.8	0.0	5.3	2.9	120.3	16.4	39.1	8.2	171.7	0.0	0.6	138
West North Central	27.4	0.0	2.0	7.8	207.2	19.5	76.2	3.9	125.1	0.0	0.0	125
South Atlantic	15.6	0.0	19.1	0.0	616.0	27.8	79.8	3.5	92.0	0.0	1.7	108
East South Central	23.8	0.0	65.3	11.9	35.6	5.9	65.3	5.9	83.2	0.0	0.0	77
West South Central	32.3	0.0	46.9	5.9	5.9	11.7	108.5	5.9	58.7	0.0	2.9	38
Mountain	24.1	0.0	176.9	0.0	562.8	8.0	96.5	16.1	233.1	0.0	0.0	241
Pacific	26.2	0.0	15.7	1.7	33.2	10.5	48.9	22.7	132.8	0.0	1.7	75
Total	14.1	0.2	13.8	3.5	169.3	17.9	60.0	6.7	121.9	0.0	2.1	105

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—During the period November 1–15, 1943, 231 cases of dengue fever were reported in Honolulu, bringing the total cases reported to date to 1,070. During the period October 1–15, 1943, 221 cases were reported, and for the period October 16–31, 1943, 321 cases.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended November 6, 1943.—During the week ended November 6, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		7	3	217	265	53	84	60	129	818
Diphtheria	1	24	10	59	1	2	2			99
Dysentery (bacillary)				3						3
Encephalitis, infectious						1				1
German measles		1		2	14		1	6	33	57
Influenza		2	2		19				8	31
Measles		2		269	503	19	2	13	11	819
Meningitis, meningococcus			1		2	1		1	1	6
Mumps		3		54	98	42	1	8	65	271
Poliomyelitis	1			2	3			1	2	9
Scarlet fever		9	2	100	99	40	17	24	39	330
Tuberculosis (all forms)		7	3	58	52	24		4	23	171
Typhoid and paratyphoid fever				23	2		1		16	42
Undulant fever				3	5					8
Whooping cough		20	1	192	136	22	11	8	13	403

EGYPT

Infectious diseases—First quarter 1943.—During the first quarter of 1943, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2		Mumps	734	11
Cerebrospinal meningitis	38	20	Pneumonia	1,940	1,442
Chickenpox	565	3	Puerperal septicemia	77	51
Diphtheria	591	223	Rabies	8	7
Dysentery	423	82	Scarlet fever	18	2
Erysipelas	568	60	Smallpox	31	2
Influenza	3,076	72	Tetanus	109	75
Jaundice, epidemic	2	1	Tuberculosis (all forms)	1,628	1,086
Leprosy	86	28	Typhoid fever	781	140
Lethargic encephalitis	1	1	Typhus fever	11,826	1,829
Malaria	4,696	192	Undulant fever	2	1
Measles	944	182	Whooping cough	762	52

Vital statistics—First quarter 1943.—Following are the numbers of births and deaths for the first quarter of 1943 for all localities in Egypt having a health bureau:

Number of live births	70,604
Births per 1,000 population	50.2
Number of stillbirths	1,209
Deaths, all causes	40,132
Deaths per 1,000 population	28.5
Deaths under 1 year of age	8,465
Deaths under 1 year of age per 1,000 live births	120

GERMANY

Infectious diseases—Week ended September 25, 1943, and January 1 to September 18, 1943—Comparative.—Cases of certain infectious diseases have been reported in Germany for the week ended September 25, 1943, and for the period January 1 to September 18, 1943, as compared with the same period of 1942:

Disease	Week ended Sept. 25, 1943	Jan. 1–Sept. 18, 1943	Corresponding period 1942
Anthrax		27	21
Cerebrospinal meningitis	30	2,032	2,237
Diphtheria	6,945	175,598	173,355
Dysentery	408	5,117	8,114
Inflammation of the brain	21	405	325
Malaria	19	561	619
Paratyphoid fever	184	3,725	2,849
Poliomyelitis	124	1,679	2,312
Psittacosis		16	3
Ptomaine poisoning	363	1,088	1,744
Scarlet fever	8,544	266,977	301,104
Trachoma	75	4,878	6,962
Tuberculosis (all forms)	2,222	110,513	110,675
Typhoid fever	703	11,733	5,851
Undulant fever (Bang's disease)		129	171
Weil's disease	6	72	24
Whooping cough	2,180	99,596	51,581

MEXICO

Cananea—Influenza.—A report dated November 19, 1943, states that for the month of October and November to date, 2,500 cases of influenza were reported in Cananea, Mexico. The disease is said to be disappearing. No deaths were reported.

Vera Cruz—Dengue fever.—A report for the week ended November 13, 1943, stated that an epidemic of dengue fever was present in Vera Cruz, where probably several hundred cases had been reported.

NICARAGUA

Poliomyelitis.—A report dated November 18, 1943, states that since October 23, 1943, 11 cases of poliomyelitis have been reported in Nicaragua, 9 of these cases having occurred in Managua.

TUNISIA

Infectious diseases—August 1943.—During the month of August 1943, cases of certain infectious diseases were reported in Tunisia as follows:

Disease	Cases	Disease	Cases
Diphtheria	11	Tuberculosis (all forms)	74
Dysentery	29	Typhoid and paratyphoid fever	94
Recurrent fever	1	Typhus fever	92
Scarlet fever	2		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Cochinchina.—For the period September 21–30, 1943, 1 case of plague was reported in Cochinchina, Indochina.

Smallpox

Guinea (French).—For the period October 11–20, 1943, 34 cases of smallpox with 4 deaths were reported in French Guinea.

Indochina.—Smallpox has been reported in Indochina as follows: September 21–30, 1943, 78 cases; October 11–20, 1943, 97 cases.

Sudan (French).—For the period October 11–20, 1943, 110 cases of smallpox with 4 deaths were reported in French Sudan.

Turkey.—For the month of September 1943, 524 cases of smallpox (including 10 cases reported in Istanbul) were reported in Turkey.

Typhus Fever

Greece.—During the year 1942, 405 cases of typhus fever (including 277 cases in Athens and Piraeus, and 57 cases in Salonika) were reported in Greece.

Hungary.—Typhus fever has been reported in Hungary as follows: October 17–30, 1943, 10 cases; November 1–13, 1943, 20 cases.

Rumania.—For the period October 8–15, 1943, 84 cases of typhus fever were reported in Rumania.

Slovakia.—Typhus fever has been reported in Slovakia as follows: October 17–30, 1943, 12 cases; week ended November 6, 1943, 12 cases.

Turkey.—For the month of September 1943, 72 cases of typhus fever were reported in Turkey.

Yellow Fever

Portuguese Guinea.—On November 10, 1943, an outbreak of yellow fever was reported in Portuguese Guinea. No figures were given.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON: 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

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Vol. 58 • DECEMBER 17, 1943 • *No. 51*

INFLUENCE OF pH AND TEMPERATURE ON THE SURVIVAL OF COLIFORMS AND ENTERIC PATHOGENS WHEN EXPOSED TO FREE CHLORINE[1]

By C. T. Butterfield, *Principal Bacteriologist*, Elsie Wattie, *Bacteriologist*, Stephen Megregian, *Assistant Chemist*, and C. W. Chambers, *Junior Bacteriologist, United States Public Health Service*

Studies of water disinfection methods, with particular reference to the requirements in military and war industry areas, have been instituted at the Stream Pollution Investigations Laboratory of the United States Public Health Service at Cincinnati, Ohio. Streeter (*1*) has outlined these studies of water disinfection methods. In connection with these studies, Moore (*2*) has shown the use of p-aminodimethylaniline as an indicator for "free chlorine"; Wattie and Chambers (*3*) have reported on the relative resistance of coliforms and some of the enteric pathogens to the excess-lime method of water treatment; and Moore, Megregian, and Ruchhoft (*4*) have presented data on some of the chemical aspects of the ammonia-chlorine treatment of water.

Streeter (*1*) on the basis of preliminary results on chlorination has pointed out the desirability of (*a*) "maintaining free chlorine residuals of 0.1 to 0.2 p. p. m., where rapid and effective bactericidal action is needed," and (*b*) "chlorinating waters of any free ammonia content beyond the break-point whenever the high bactericidal power of free chlorine is required."

A brief survey of the related literature indicates that little information is available concerning the bactericidal properties of "free" chlorine to the absolute exclusion of chlorine-addition products (chloramines, etc.). It is well known that the bacterial death rate with chlorine-addition products is markedly less than that of free chlorine, though such products are included with the free chlorine in the ordinary tests for residuals. This points to the necessity of the elimination of all chlorine-absorbing, or chlorine-addition products, from the suspending menstruum in determinations of the bactericidal properties of free chlorine.

[1] From the Division of Public Health Methods, National Institute of Health, Stream Pollution Investigations, Cincinnati, Ohio.

Tonney, Greer, and Danforth (*5*) studied the minimal "chlorine death points" of vegetative cells of a number of genera of bacteria. They used sterile distilled water as a suspending menstruum and discarded the results of any tests in which definite chlorine losses were observed. While the pH of their initial waters was stated to be 6.4 to 7.2, apparently no effort was made to control the hydrogen-ion concentration of the final mixtures. Tests were made at various temperatures, from room temperature to near the freezing point. They concluded, in general, that the vegetative cells of the enteric pathogens studied were killed by a 15-second exposure to 0.1 p. p. m. of free chlorine while coliforms, on the whole, were more resistant; nine strains of coli required 0.25 p. p. m. of free chlorine for complete destruction in 15 seconds. This work was repeated by Tonney, Greer, and Liebig (*6*), confirming these results with an increased number of genera and species. In this later study more thorough procedures were used to assure the elimination of chlorine absorption products but apparently the pH was not controlled.

Heathman, Pierce, and Kabler (*7*) studied the resistance of coliforms and *E. typhosa* to chlorine and chloramines. They used tap water as a suspending medium with a pH range of from 6.4 to 7.9, with observations at two temperature ranges, room temperature and slightly above freezing. In their tests of the bactericidal effect of free chlorine they attempted to destroy the chlorine absorption substances by preliminary doses of chlorine. They concluded in part that (1) the disinfection action of chlorine is variable within limits, (2) longer times are required to kill coliforms and *E. typhosa* at lower temperatures, (3) recently isolated strains are more resistant to chlorine, and (4) there is a possibility, according to their observations, that *E. typhosa* may persist in chlorine-treated waters longer than the coliforms. Subsequent studies and our own experiences lead to the belief that the methods used in obtaining chlorine-demand-free water were not successful in all cases, and that their results cannot be accepted as indicative of the effect of either free chlorine or chloramine alone. This belief is substantiated by the statement of Heathman et al. that "chlorine in the low-initial-residual ranges exhibited a killing action very similar to chloramine," and that "with greater initial residuals about one-half of the waters studied also resembled chloramine in action." Residual chlorine and chloramine were determined by orthotolidine. Thus, considerable doubt may exist as to the nature of the bactericidal agents active in their studies. There is general agreement among workers in this field that at normal temperatures and pH ranges the killing action of chlorine is much more rapid than that of chloramine.

As this cursory review of the literature dealing with the bacterial

killing power of "free" chlorine and the results of preliminary observations reported by Streeter (*1*) indicated quite clearly the need for further intensive study of this problem, particularly of the bactericidal action of free chlorine and some of the factors which may affect its efficiency, studies were made of the bactericidal properties of free chlorine as affected by the following variables: (1) time of exposure to chlorine, (2) variations in the hydrogen-ion concentration of the suspending water, (3) the temperature of the water, and (4) to a limited extent only, the individual variations in resistance to chlorine, under the above conditions, of some of the coliforms and enteric pathogens. The results obtained should be of especial interest whenever free chlorine, apart from chlorine-addition products, is used as the bactericidal agent as, for instance, post break-point chlorine in the break-point chlorination process.

METHODS

Chlorine-free, chlorine-demand-free water.—The primary requirement for such a study was a water of the necessary properties for use as the basic suspending menstruum in all tests. These properties might be described as follows. The water must be: (1) nontoxic to bacteria except for the effect of the variables under test, such as chlorine and pH; (2) well buffered at the required pH; (3) free of all ammonia and organic matter capable of combining with chlorine to form chlorine-addition products; (4) free of chlorine and of substances which would give a test with the usual chlorine reagents, and (5) of such a nature that when a calculated amount of chlorine or hypochlorite solution is applied to a definite volume of the water it may be recovered quantitatively after 5 minutes without a loss in residual, and after several hours contact must still give a test for free chlorine.

The preparation of a water to meet the above requirements offered considerable difficulties. A detailed consideration of the procedures to be observed in the preparation of such waters has been presented by Megregian (*8*). In brief, the waters used in this study were prepared as follows: Carboys containing approximately 5 gallons of a good quality distilled water were dosed with 3 to 5 p. p. m. of chlorine and a chlorine residual was maintained for several days. About 36 hours prior to each test, 5 liters of this water were drawn off to a 6-liter Erlenmeyer flask, Clarks and Lubs (*9*) buffer solutions of the desired hydrogen-ion concentration were added at a ratio of 50 ml. of buffer per liter of water, and the buffered water was brought to a boil and allowed to simmer for 1 minute. After cooling (usually overnight) the water was tested for residual chlorine and dechlorinated with a freshly prepared 0.2-percent solution of sodium sulfite in such a manner that at most only a very slight trace of sulfite remained. The

water was then vigorously shaken, allowed to stand for a few hours in order to oxidize any trace of excess sulfite with dissolved oxygen, and then boiled for 20 minutes to kill vegetative cells introduced during the adjustment. Water thus prepared was cooled to the desired temperature for each test. It was not held longer than 18 to 24 hours before use, as it readily absorbs ammonia and other gases in sufficient amount to impart a considerable chlorine demand. Prior to use in each experiment the pH of the water was checked and if it was not at the pH desired it was adjusted with appropriate sterile reagents. It was also tested (1) for chlorine (if any amount was present the water was discarded), and (2) for chlorine demand. In testing for chlorine demand a calculated amount of chlorine, from a titrated solution, was added to a measured amount of the water, allowed to stand for 5 minutes, and the residual determined. If no loss occurred, the water was used. A loss of 0.01 p. p. m. was considered significant for our purposes and such waters were discarded.

Preparation of glassware.—Traces of material left on glassware interfered materially with sustained chlorine residuals. Even the residue from a few drops of tap water, used as a rinse, dried on the inside of a flask, or the condensate from the steam of autoclave sterilization was found at times to require as much as 0.01 to 0.05 p. p. m. of applied chlorine when 500 ml. of the prepared water was added to a 1-liter flask and tested. Therefore, glassware used in these tests not only was sterilized but also was made chemically clean. To accomplish this, all glassware was cleaned by strong chromic acid cleaning solution, rinsed ten times with tap water, followed by two rinses with distilled water, then dried and sterilized in dry, hot air.

Preparation of stock chlorine solution.—Chlorine solutions used in these studies were prepared from a stock solution of sodium hypochlorite (NaOCl). Portions of this stock solution were diluted to approximately the desired concentration (25 to 100 p. p. m.) with unbuffered chlorine-demand-free water. A 100-ml. sample of this diluted chlorine solution was taken and its chlorine content determined quantitatively by titration with 0.0282 N sodium thiosulfate ($Na_2S_2O_3$) using the acid-starch-iodide method. In this titration 1 ml. of $Na_2S_2O_3$ solution is the equivalent of 10 p. p. m. of chlorine when a 100-ml. sample is titrated. This dilute chlorine solution was prepared fresh before each test. In the tests, appropriate quantities of this titrated chlorine solution were added to each 500-ml. portion of chlorine-free, chlorine-demand-free water to give the concentration of chlorine desired.

Determination of free chlorine residual.—As indicated above, the initial chlorine concentrations for each test were determined by quantitative dilutions of a stock chlorine solution, which had been titrated by the starch-iodide method. These calculated chlorine con-

centrations were also read by the standard orthotolidine test, using 100 ml. of the sample *(10)*. The latter was the only method used for the determination of chlorine residuals during the tests. Although the standard orthotolidine test does not differentiate between chlorine and chloramine, it was the only available test which could be used quantitatively. Moore *(2)*, who presents such a differential test and reviews other tests, points out that none of these differential tests is accurately quantitative, especially in low concentrations. Consequently, the only criteria by which free chlorine could be assumed were that (1) all substances, other than the bacteria to be added, which are capable of reacting with chlorine had been removed, and (2) the maximum color developed by the orthotolidine reagent was produced almost immediately. The appearance of a definite color after 10 to 30 seconds of contact with the orthotolidine was considered as clear-cut evidence of the presence of free chlorine.

In the tests with pathogenic organisms, the procedure for the determination of residual chlorine was modified to eliminate the risk of contaminating the analyst. Samples for residual chlorine determinations containing pathogens were withdrawn with a sterile 100-ml. pipette and allowed to run into the Nessler tube simultaneously with the orthotolidine reagent. The tubes thus partially mixed were set aside for 5 minutes to provide for more complete mixing by gravity and diffusion. Although maximum color was attained in 1 to 2 minutes by this procedure with free chlorine, all readings were made after a reaction time of 5 minutes to standardize the procedure.

The only other deviation from the standard procedure was that 2 ml. of orthotolidine reagent were added instead of 1 ml. as specified in Standard Methods *(10)*. This was considered necessary in order to counteract the buffer concentration of the test waters used.

Determination of hydrogen-ion concentration.—The hydrogen-ion concentration of the waters used was determined routinely by colorimetric procedures, using LaMotte color standards and indicators. These standards and occasional sets of samples were also checked electrometrically at intervals during the course of the tests.

Preparation of bacterial suspensions.—Eleven freshly isolated strains of five genera of bacteria were used in this study. This included two strains each of *Escherichia coli; Aerobacter aerogenes, Pseudomonas pyocyanea, Eberthella typhosa,* and three strains of *Shigella dysenteriae.* One of the *E. typhosa* strains was from a blood culture of a clinically typical case of typhoid fever and all three Shigellas were from the stools of typical cases of Shiga dysentery. In preparing suspensions of these bacteria, the entire surface of a standard agar slant was inoculated with a young culture of the organism under test and incubated for 20 to 24 hours at 37° C. The growth on this slant was carefully washed off with about 2 ml. of water and diluted to 100 ml.

with sterile dilution water. This first dilution was shaken vigorously and allowed to stand quiescent for about 10 minutes. An appropriate quantity of the first dilution was then transferred to a second 99-ml. portion of sterile dilution water and vigorously shaken. By "appropriate quantity" is meant that amount from the first dilution which would provide a bacterial population of about 800,000 per ml. in the second dilution bottle. This quantity varied somewhat (from 0.3 to 2.2 ml.) for the different cultures in use but this part of the work could be estimated quite accurately by the bacteriologist, who had had a very considerable experience in preparing this type of suspension. In all cases a 1-ml. portion of this second dilution was added to each test flask containing 400 ml. of water. Thus 1 ml. of suspension containing approximately 800,000 bacteria, added to 400 ml. of sterile chlorine-demand-free water, provided a mixture containing a calculated number of 2,000 bacteria per ml. This approximate density of bacterial population was selected for these tests because (1) it was a suitable number for making counts and measuring decreases; (2) it was not in excess of the number which might be expected in many waters; and (3) preliminary tests had shown that bacterial mixtures as prepared, containing up to 50,000 organisms per ml., exercised no measurable demand on calculated additions of free chlorine.

It is of interest to note here as an illustration of the consistency of the initial bacterial numbers that in 20 of 21 series of tests conducted with *Esch. coli* strains, the average initial bacterial content was 2,330 per ml. with a maximum count of 3,960 per ml. and a minimum count of 2,040 per ml. In the other coli series, apparently due to a decimal error in the preparation of the suspension, the initial count was only 302 per ml. However, the results in this series, as well as in preliminary tests with initials up to 50,000 bacteria per ml., did not show any skew deviations in residual chlorine or in the decrease of bacterial numbers. In 16 series of tests with *E. typhosa* strains, the average initial was 1,930 organisms per ml. with a maximum of 3,620 and a minimum of 1,060 per ml., while in 10 series with *Ps. pyocyanea* the average initial number per ml. was 1,990, with a maximum of 2,380 and a minimum of 1,620 per ml. In five series of tests with *S. dysenteriae* and four with *A. aerogenes*, the average, maximum, and minimum initial numbers of organisms per ml. were 1,940, 2,410, 1,360, and 1,770, 4,320, and 1,100, respectively.

Bacterial counts.—Quantitative determinations of the number of bacteria per ml. were made by agar plate counts. In this, the procedures given in Standard Methods (*10*) were followed with two exceptions or additions. Instead of planting two plates with the required quantity of sample, eight plates were made for the initial count from the control flask, which received no chlorine, and four

initial plates from each of the other chlorine-bearing flasks in each series. For each examination made at various intervals subsequent to the initial, four plates were made of the control flask and duplicate plates (two 1-ml. and two $\frac{1}{10}$-ml. plates) from each of the other flasks. Routine sterility examinations of the water, pipettes, petri dishes, and agar were made for each test. Plates were incubated for 24 hours at 37° C. and counted with the aid of a Quebec colony counter. Plates which showed a zero count or a markedly reduced number of colonies were incubated for an additional 24 hours and reexamined to check on the possibility of delayed growth. Representative colonies, or all of the colonies if less than 10, on plates showing marked reductions from the initial, were picked and subjected to appropriate identification before final certification of the results. Incidental colonies of air-borne bacteria, never more than one or two colonies per plate, were encountered only rarely.

Neutralization of chlorine.—As the bactericidal action of the chlorine would continue until it was spent or neutralized, it was necessary when using a plating procedure to have some method of stopping the chlorine action at the exact time interval desired. This was particularly important for the short-time periods of examination, 1, 3, 5, and 10 minutes. To provide for this step, measured quantities of sterile, 2-percent peptone solution were prepared. Just prior to the required time of examination a volume of the water being tested, equal to the measured amount of peptone solution, was removed from the flask with a sterile rapid delivery pipette and, exactly at the desired time, added to the peptone solution with immediate mixing. Preliminary tests indicated that this stopped chlorine action and provided the necessary time for plating the sample in a correct manner. The resultant dilution by the peptone water was compensated by plating double quantities of such portions.

TEST PROCEDURES

In this study, utilizing the materials, equipment, and methods described, 56 series of tests were performed in addition to the preliminary exploratory experiments. In each series three bacteriologists and one chemist cooperated simultaneously, one making the additions of bacteria, chlorine, and mixing, another keeping the time record, withdrawing bacteriological samples, and neutralizing, a third bacteriologist planting the samples, and the chemist making the residual chlorine and pH examinations. A "series" consisted of repeated observations on eight test portions of water. Two portions served as controls. These two were identical with the other six portions and were treated in exactly the same manner except that one did not receive any chlorine and the other did not receive any bacteria. The

other six portions received varying amounts of previously standardized chlorine solution. Bacterial plate counts were made on portions from the chlorine-bearing flasks at the start and either at the 1-, 3-, 5-, 10-, 15-, 30-, 60-, 90-, and 120-minute intervals or at the 1-, 3-, 5-, 10-, 20-, and 60-minute intervals depending on the bacterial death rate. Observations on the control flasks were made at all intervals except the 1-, 3-, and 5-minute periods. Residual chlorine determinations were made at the start, at the end of 1 hour, and at 2 hours if the test was continued for 2 hours.

In setting up a test 500 ml. of sterile, chlorine-free, chlorine-demand-free water were added to each of eight sterile, 1-liter Erlenmeyer flasks. From one of these, the control flask, 100 ml. were removed and tested for chlorine. One ml. of the standardized bacterial suspension was then added to this flask, the contents thoroughly mixed, and portions removed for making the initial counts. A second flask, also serving as a control, received a known amount of chlorine and was tested for residual chlorine after 5 minutes standing at the desired temperature and at intervals thereafter. This flask also was equipped with a thermometer to provide for temperature readings.

The remaining six flasks were dosed with chlorine in varying amounts, depending on the requirements of the particular test. A time interval was allowed between the dosing of each flask with chlorine so that there would be no conflict in the time for subsequent examinations of the contents of the various flasks. As soon as the titrated amount of chlorine had been added to each flask, its contents were thoroughly mixed and 5 minutes later a 100-ml. portion was removed for a residual chlorine determination. Simultaneously with the fixing of the chlorine in this test portion with orthotolidine, the 1 ml. of bacterial suspension was added to the remaining 400 ml. in the flask, mixed quickly and thoroughly, the time was noted, and portions were removed for examination at the indicated intervals. A time schedule was prepared for each flask in a series to insure accuracy in the times of sampling. For all series conducted at 2° to 5° C. and at 20° to 25° C. (when room temperatures were not in this range), the flasks were kept in a water bath with the temperature maintained.

RESULTS

In conducting these 56 series of tests, an effort was made to extend the range of the observations to the limits which might be encountered in practical operation, with the thought that the results, even though limited in scope, might serve as a general guide. Thus, with regard to the hydrogen-ion concentrations, most of the tests were conducted at pH 7.0, 8.5, 9.8, and 10.7 with exploratory experiments at pH 6.5 and 7.8. Two temperature ranges were investigated, 2° to 5° C. and 20° to 25° C., ranges which might be considered the average extremes

met in nature. It is recognized that the work is incomplete in that (1) a greater number of bacterial strains should have been used, and (2) additional temperatures and pH ranges should have been investigated. Time did not permit this more extended study, however, and the results submitted may serve as a guide for the intermediate ranges. It can be definitely stated, at least, that the data presented were carefully determined and that, without question, they represent the action of free chlorine without the interference of any chlorine-addition products. It is noted that in some instances other factors, such as hydrogen-ion concentration (particularly in the tests at pH 9.8 and 10.7), may have also played a part in bacterial decrease; however, as shown in the reference cited (*3*), the rate of bacterial kill induced by pH effects is quite slow as compared with chlorine action. It should be reemphasized at this time that the results presented here were secured with free chlorine, and that free chlorine is a much more effective bactericidal agent than an equivalent amount of chloramine or any combination of chlorine and chloramine, as has been pointed out by Streeter (*1*) and many others.

The average results obtained with each range of residual chlorine concentration, under all conditions tried, from these 56 series of tests are presented in six tables. Table 1 gives the average results obtained with all *Esch. coli* strains, and tables 2, 3, 4, and 5, the results for *A. aerogenes*, *Ps. pyocyanea*, *E. typhosa*, and *S. dysenteriae*, respectively. Table 6 is a compilation showing the time in minutes required to produce a 100-percent kill under the various conditions.

TABLE 1.—*Average survival of* Esch. coli, *expressed in percent of initial number when exposed to chlorine in various concentrations at pH 7.0, 8.5, 9.8, and 10.7 when held at 2° to 5° C., and at 20° to 25° C.*

Number of strains	Number of tests	Average percentage surviving after varying exposures										Average chlorine p. p. m. after exposure		
		1 min.	3 min.	5 min.	10 min.	15 min.	20 min.	30 min.	60 min.	90 min.	120 min.	0 min.	60 min.	120 min.
2° to 5° C. pH 7.0														
1	2	100.0	------	------	------	99.4	------	98.2	88.6	90.1	96.0	0.00	------	0.00
1	2	96.1	95.4	92.0	[1]85.4	78.8	------	83.0	76.8	70.0	71.8	0.02	------	0.02
1	2	80.0	9.6	0.1	[1]0.0	0.0	------	0.0	0.0	0.0	0.0	0.03	------	0.02
1	2	70.2	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.04	------	0.04
1	2	40.5	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.05	------	0.04
1	2	0.0	0.0	0.0	------	0.0	------	0.0	0.0	------	------	0.10	0.09	------
pH 8.5														
1	2	100.0	------	------	89.5	------	91.5	------	76.3	------	------	0.00	0.00	------
1	2	94.6	81.4	70.3	20.9	------	0.3	------	0.0	------	------	0.05	0.04	------
1	2	86.0	59.6	25.8	0.5	------	0.0	------	0.0	------	------	0.07	0.06	------
1	8	57.3	11.1	0.7	0.0	------	0.0	------	0.0	------	------	0.14	0.12	------

[1] Interpolated figure.

TABLE 1.—*Average survival of* Esch. coli, *expressed in percent of initial number, when exposed to chlorine in various concentrations at pH 7.0, 8.5, 9.8, and 10.7 when held at 2° to 5° C., and at 20° to 25° C.*—Continued

Number of strains	Number of tests	Average percentage surviving after varying exposures										Average chlorine p. p. m. after exposure		
		1 min.	3 min.	5 min.	10 min.	15 min.	20 min.	30 min.	60 min.	90 min.	120 min.	0 min.	60 min.	120 min.
pH 9.8														
1	2	100.0	------	------	88.9	------	92.8	------	72.6	------	------	0.00	0.00	------
1	2	83.8	82.3	79.6	79.5	------	70.2	------	42.4	------	------	0.05	0.05	------
1	4	89.2	73.7	73.4	47.5	------	19.4	------	0.1	------	------	0.15	0.15	------
1	2	90.3	65.6	36.1	2.2	------	0.0	------	0 0	------	------	0.40	0.40	------
1	2	77.6	32.6	4.8	0.0	------	0.0	------	0.0	------	------	0.72	0.72	------
1	2	56.4	2.6	0.1	0.0	------	0.0	------	0.0	------	------	1.00	1.00	------
pH 10.7														
1	2	100.0	------	------	87.4	------	79.5	------	51.0	------	------	0.00	0.00	------
1	2	98.3	92.6	91.0	92.6	------	59.2	------	37.9	------	------	0.10	0.10	------
1	2	96.6	92.4	76.6	54.7	------	13.0	------	0.0	------	------	0.30	0.30	------
1	2	99.2	89.3	82.4	44.6	------	8.4	------	0.0	------	------	0.40	0.40	------
1	2	97.1	94.8	74.0	36.4	------	5.1	------	0.0	------	------	0.50	0.50	------
1	2	90.8	95.7	58.5	22.2	------	1.7	------	0.0	------	------	0.75	0.75	------
1	2	95.5	82.7	50.8	9.4	------	0.2	------	0.0	------	------	1.00	1.00	------
20° to 25° C. pH 7.0														
2	3	98.6	------	------	------	100.0	------	96.6	94.8	97.5	96.8	0.00	------	0.00
2	4	29.1	16.2	19.4	[1] 18.0	17.7	------	18.6	19.4	[1] 17.5	15.6	0.02	0.01	Tr.
2	4	16.1	0.8	0.8	[1] 0.6	0.3	------	0.2	0.8	0.1	0.1	0.03	0.02	0.01
1	2	0.0	0.0	0.0	[1] 0.0	0.0	------	0.0	0.0	0.0	0.0	0.04	0.03	0.02
2	3	0.0	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.05	0.04	0.03
2	3	0.0	0.0	0.0	------	0.0	------	0.0	0.0	------	------	0.07	0.06	------
2	2	0.0	0.0	0.0	------	0.0	------	0.0	0.0	------	------	0.10	0.10	------
pH 8.5														
1	2	100.0	------	------	94.6	------	92.4	------	95.4	------	------	0.00	0.00	------
1	2	90.0	64.1	29.6	1.2	------	0.2	------	0.0	------	------	0.05	0.05	------
1	2	87.0	5.9	0.2	0.0	------	0.0	------	0.0	------	------	0.07	0.07	------
1	8	29.5	0.1	0.1	0.0	------	0.0	------	0.0	------	------	0.14	0.14	------
pH 9.8														
1	4	100.0	------	------	97.0	------	91.9	------	69.0	------	------	0.00	0.00	------
1	1	83.2	99.1	76.1	81.4	------	56.2	------	5.8	------	------	0.02	0.02	------
1	3	93.4	88.5	70.7	56.8	------	44.7	------	9.5	------	------	0.04	0.04	------
1	2	80.0	67.6	33.5	2.0	------	0.0	------	0.0	------	------	0.06	0.06	------
1	2	85.4	43.0	7.8	0.2	------	0.0	------	0.0	------	------	0.08	0.08	------
1	9	65.7	30.4	13.7	2.8	------	0.0	------	0.0	------	------	0.14	0.13	------
1	2	58.3	3.1	0.0	0.0	------	0.0	------	0.0	------	------	0.30	0.26	------
1	2	48.3	0.4	0.0	0.0	------	0.0	------	0.0	------	------	0.40	0.38	------
1	1	59.4	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.50	0.46	------
1	1	5.8	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.75	0.75	------
1	1	0.0	0.0	0.0	0.0	------	0.0	------	0.0	------	------	1.00	1.00	------
pH 10.7														
1	4	100.0	------	------	93.4	------	78.2	------	44.4	------	------	0.00	0.00	------
1	2	97.8	95.7	90.5	73.9	------	44.6	------	6.4	------	------	0.02	0.02	------
1	1	92.2	65.5	79.3	45.7	------	9.0	------	0.0	------	------	0.03	0.03	------
1	1	72.4	74.1	64.6	31.2	------	2.8	------	0.0	------	------	0.04	0.04	------
1	1	85.3	82.8	64.6	16.2	------	0.2	------	0.0	------	------	0.05	0.05	------
1	2	85.8	74.5	67.2	35.2	------	9.0	------	0.0	------	------	0.06	0.06	------
1	6	86.6	75.7	39.5	7.9	------	0.4	------	0.0	------	------	0.16	0.16	------
1	3	87.9	33.2	8.3	0.3	------	0.0	------	0.0	------	------	0.30	0.29	------
1	3	81.4	18.0	3.0	0.0	------	0.0	------	0.0	------	------	0.40	0.40	------
1	3	74.8	9.6	0.6	0.0	------	0.0	------	0.0	------	------	0.53	0.52	------
1	1	37.7	2.6	0.0	0.0	------	0.0	------	0.0	------	------	0.75	0.75	------
1	1	31.8	0.7	0.7	0.0	------	0.0	------	0.0	------	------	1.00	1.00	------

[1] Interpolated figure.

TABLE 2.—*Average survival of* A. aerogenes, *expressed in percent of initial number, when exposed to chlorine in various concentrations at pH 7.0 when held at 20° to 25° C.*

Number of strains	Number of tests	Average percentage surviving after varying exposures										Average chlorine p. p. m. after exposure		
		1 min.	3 min.	5 min.	10 min.	15 min.	20 min.	30 min.	60 min.	90 min.	120 min.	0 min.	60 min.	120 min.
2	4	100.0	------	------	------	95.5	------	96.7	97.7	96.3	97.3	0.00	0.00	0.00
2	4	82.8	85.4	79.4	[1]82.8	86.2	------	72.1	77.5	77.0	67.9	0.02	0.02	0.01
1	2	93.2	80.2	70.8	[1]63.8	56.9	------	51.2	46.9	34.1	21.5	0.03	------	0.02
2	4	62.3	38.7	32.4	[1]32.0	31.6	------	27.8	21.5	19.0	10.0	0.04	0.03	0.03
1	2	57.6	1.4	0.2	[1]0.1	0.0	------	0.0	0.0	0.0	0.0	0.05	------	0.04
2	3	14.5	0.4	0.6	[1]0.5	0.4	------	0.4	0.1	0.0	0.0	0.06	0.05	0.05
2	2	0.0	0.0	0.0	[1]0.0	0.0	------	0.0	0.0	------	------	0.08	0.08	0.07
2	6	0.1	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.12	0.12	0.08

[1] Interpolated figure.

TABLE 3.—*Average survival of* Ps. pyocyanea, *expressed in percent of initial number, when exposed to chlorine in various concentrations at pH 7.0, 8.5, 9.8, and 10.7 when held at 20° to 25° C.*

Number of strains	Number of tests	Average percentage surviving after exposure										Average chlorine p. p. m. after exposure		
		1 min.	3 min.	5 min.	10 min.	15 min.	20 min.	30 min.	60 min.	90 min.	120 min.	0 min.	60 min.	120 min.
pH 7.0														
2	4	100.0	------	------	------	97.1	------	96.3	95.4	95.4	88.6	0.00	0.00	0.00
2	10	79.1	63.9	47.6	[1]45.4	43.1	------	43.0	40.6	37.7	32.2	0.01	0.01	Tr.
2	3	40.6	0.3	0.0	[1]0.0	0.0	------	0.0	0.0	0.0	0.0	0.03	0.02	0.02
2	2	5.2	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.04	0.03	0.03
2	4	0.0	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.05	0.04	0.04
2	4	0.0	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.06	0.05	0.05
pH 8.5														
1	2	100.0	------	------	99.2	------	99.7	------	98.2	------	------	0.00	0.00	------
1	1	91.4	100.0	88.9	88.9	------	75.3	------	61.7	------	------	0.03	0.03	------
1	2	93.4	86.4	73.4	34.4	------	34.6	------	14.6	------	------	0.04	0.04	------
1	2	78.2	77.9	33.9	1.8	------	0.0	------	0.0	------	------	0.06	0.05	------
1	1	89.6	75.5	9.1	0.0	------	0.0	------	0.0	------	------	0.08	0.05	------
1	6	80.1	1.3	0.0	0.0	------	0.0	------	0.0	------	------	0.15	0.14	------
pH 9.8														
1	2	100.0	------	------	97.4	------	88.7	------	82.6	------	------	0.00	0.00	------
1	1	91.1	94.5	82.7	96.6	------	79.7	------	40.5	------	------	0.03	0.03	------
1	2	73.6	83.8	84.6	78.7	------	59.6	------	24.8	------	------	0.05	0.04	------
1	1	80.2	70.0	70.0	43.0	------	4.0	------	0.0	------	------	0.08	0.08	------
1	7	69.1	68.4	45.4	13.2	------	0.5	------	0.0	------	------	0.17	0.16	------
1	1	41.9	47.4	12.7	0.0	------	0.0	------	0.0	------	------	0.40	0.35	------
pH 10.7														
1	2	100.0	------	------	87.9	------	86.0	------	73.0	------	------	0.00	0.00	------
1	1	90.8	85.7	95.4	62.2	------	76.8	------	32.4	------	------	0.05	0.04	------
1	4	67.4	72.3	66.8	37.4	------	31.0	------	0.0	------	------	0.17	0.16	------
1	2	75.6	77.0	49.3	2.1	------	0.0	------	0.0	------	------	0.30	0.28	------
1	2	68.6	69.0	31.6	0.4	------	0.0	------	0.0	------	------	0.40	0.38	------
1	1	67.4	61.6	16.3	0.3	------	0.0	------	0.0	------	------	0.50	0.50	------
1	1	73.7	34.7	9.4	0.0	------	0.0	------	0.0	------	------	0.75	0.70	------
1	1	72.1	28.4	2.4	0.0	------	0.0	------	0.0	------	------	1.00	1.00	------

[1] Interpolated figure.

TABLE 4.—*Average survival of* E. typhosa, *expressed in percent of initial number, when exposed to chlorine in various concentrations at pH 7.0, 8.5, 9.8, and 10.7, when held at 2° to 5° C. and at 20° to 25° C.*

Number of strains	Number of tests	Average percentage surviving after exposure										Average chlorine p. p. m. after exposure		
		1 min.	3 min.	5 min.	10 min.	15 min.	20 min.	30 min.	60 min.	90 min.	120 min.	0 min.	60 min.	120 min.
2° to 5° C. pH 7.0														
1	2	100.0	------	------	------	95.9	------	100.0	100.0	92.0	88.8	0.00	------	0.00
1	2	86.4	75.1	56.2	[1]47.2	38.6	[1]34.9	27.4	19.9	16.8	8.0	0.02	------	0.02
1	2	67.1	2.3	0 1	[1]0.0	0.0	------	0.0	0.0	0.0	0.1	0.03	------	0.03
1	2	36.2	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.04	------	0.04
1	1	8.2	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.05	------	0.05
1	3	10.6	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.06	0.06	0.06
1	2	0.0	0.0	0.0	------	0.0	------	0.0	0.0	------	------	0.08	0.08	------
pH 9.8														
1	2	100.0	------	------	88.6	------	77.8	------	75.2	------	------	0.00	0.00	------
1	2	80.8	79.6	75.6	54.6	------	43.6	------	19.8	------	------	0.05	0.04	------
1	4	77.2	68.2	48.8	24.9	------	4.4	------	0.0	------	------	0.15	0.15	------
1	2	54.2	32.7	15.1	0.1	------	0.0	------	0.0	------	------	0.40	0.36	------
1	2	42.4	18.4	1.6	0.0	------	0.0	------	0.0	------	------	0.74	0.74	------
1	2	36.4	2.2	0.0	0.0	------	0.0	------	0.0	------	------	1.00	1.00	------
20° to 25° C. pH 7.0														
2	5	100.0	------	------	------	96.2	------	98.4	99.0	96.9	96.6	0.00	0.00	0.00
2	6	82.7	77.6	72.3	[1]68.5	64.7	[1]63.5	61.0	48.4	49.3	41.1	0.02	------	0.01
2	4	71.0	33.8	27.2	[1]25.4	23.6	[1]24.0	25.0	22.0	19.0	13.5	0.03	------	0.02
2	5	16.8	1.3	0.1	[1]0.1	0.0	[1]0.0	0.0	0.0	0.0	0.0	0.04	------	0.04
2	4	8.9	6.9	4.8	[1]2.9	1.1	[1]0.8	0.1	0.0	0.0	0.0	0.05	------	0.04
2	5	6.0	0.0	0.0	[1]0.0	0.0	[1]0.0	0.0	0.0	0.0	0.0	0.06	0.06	0.06
2	5	1.0	0.0	0.0	[1]0.0	0.0	------	0.0	0.0	0.0	0.0	0.08	0.07	0.07
1	1	0.0	0.0	0.0	[1]0.0	0.0	------	0.0	0.0	------	------	0.15	0.13	------
pH 8.5														
1	2	100.0	------	------	95.7	------	93.1	------	87.5	------	------	0.00	0.00	------
1	1	81.6	47.7	13.2	0.4	------	0.3	------	6.0	------	------	0.03	0.02	------
1	2	70.2	2.4	0.0	0.0	------	0.0	------	0.0	------	------	0.06	0.04	------
1	2	42.8	0.1	0.0	0.0	------	0.0	------	0.0	------	------	0.08	0.06	------
1	7	3.9	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.15	0.14	------
20° to 25° C. pH 9.8														
1	2	100.0	------	------	72.5	------	61.2	------	28.0	------	------	0.00	0.00	------
1	1	93.1	85.6	55.2	7.7	------	0.7	------	0.0	------	------	0.05	0.05	------
1	4	62.2	11.4	0.6	0.0	------	0.0	------	0.0	------	------	0.16	0.16	------
1	2	26.0	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.30	0.26	------
1	2	17.0	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.40	0.36	------
1	1	6.0	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.50	0.46	------
1	1	0.3	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.75	0.65	------
1	1	0.0	0.0	0.0	0.0	------	0.0	------	0.0	------	------	1.00	0.90	------
pH 10.7														
1	3	100.0	------	------	47.1	------	27.3	------	10.5	------	------	0.00	0.00	------
1	2	92.8	82.8	78.6	48.8	------	18.0	------	0.4	------	------	0.01	0.01	------
1	1	97.8	69.3	61.4	20.7	------	1.3	------	0.0	------	------	0.03	0.02	------
1	2	85.4	62.9	35.9	5.6	------	0.3	------	0.0	------	------	0.04	0.04	------
1	2	88.8	65.6	21.2	0.9	------	0.1	------	0.0	------	------	0.06	0.06	------
1	4	92.0	38.5	11.5	0.8	------	0.0	------	0.0	------	------	0.18	0.15	------
1	2	72.6	6.3	0.1	0.0	------	0.0	------	0.0	------	------	0.30	0.26	------
1	2	65.4	1.9	0.0	0.0	------	0.0	------	0.0	------	------	0.40	0.38	------
1	1	47.8	0.7	0.0	0.0	------	0.0	------	0.0	------	------	0.50	0.50	------
1	1	31.8	0.0	0.0	0.0	------	0.0	------	0.0	------	------	0.75	0.75	------
1	1	8.2	0.0	0.0	0.0	------	0.0	------	0.0	------	------	1.00	1.00	------

[1] Interpolated figure.

TABLE 5.—*Average survival of* S. dysenteriae, *expressed in percent of initial number when exposed to chlorine in various concentrations at pH 7.0 when held at 20° to 25° C*

Number of strains	Number of tests	Average percentage surviving after exposure										Average chlorine p. p. m. after exposure		
		1 min.	3 min.	5 min.	10 min.	15 min.	20 min.	30 min.	60 min.	90 min.	120 min.	0 min.	60 min.	120 min.
3	5	100.0	------	------	------	98.9	------	90.5	94.4	83.2	84.4	0.00	0.00	0.00
3	5	85.7	76.6	75.1	[1] 71.2	67.4	------	56.4	28.7	30.5	22.4	0.01	------	0.01
3	4	50.6	27.6	25.7	[1] 24.0	22.2	------	23.2	17.0	10.8	4.3	0.03	------	0.03
3	5	51.9	28.9	15.6	[1] 12.0	9.5	------	4.8	0.1	0.1	0.0	0.04	------	0.04
3	4	0.2	0.0	0.0	[1] 0.0	0.0	------	0.0	0.0	0.0	0.0	0.05	0.05	0.04
3	3	13.2	0.0	0.0	------	0.0	------	0.0	0.0	0.0	0.0	0.06	0.06	0.05
3	3	1.0	0.0	0.0	------	0.0	------	0.0	0.0	------	------	0.08	0.08	------

[1] Interpolated figure.

TABLE 6.—*Time in minutes required to produce a 100-percent kill of bacteria when exposed to chlorine and various hydrogen-ion concentrations at two temperatures*

Chlorine range p. p. m.	pH 7.0					pH 8.5			pH 9.8			pH 10.7		
	Esch. coli	*A. aerogenes*	*Ps. pyocyanea*	*E. typhosa*	*S. dysenteriae*	*Esch. coli*	*Ps. pyocyanea*	*E. typhosa*	*Esch. coli*	*Ps. pyocyanea*	*E. typhosa*	*Esch. coli*	*Ps. pyocyanea*	*E. typhosa*
2° to 5° C.														
0.010–0.025	>120	------	------	>120	------	----	------	------	------	------	------	------	------	----
0.026–0.035	[1]10	------	------	[2]10	------	----	------	------	------	------	------	------	------	----
0.036–0.045	3	------	------	3	------	----	------	------	------	------	------	------	------	----
0.046–0.055	3	------	------	3	------	60	------	------	>60	------	>60	------	------	----
0.056–0.070	------	------	------	3	------	20	------	------	------	------	------	------	------	----
0.071–0.099	------	------	------	1	------	----	------	------	------	------	------	------	------	----
0.10–0.29	1	------	------	------	------	10	------	------	>60	------	60	>60	------	----
0.30–0.39	------	------	------	------	------	----	------	------	------	------	------	60	------	----
0.40–0.49	------	------	------	------	------	----	------	------	20	------	20	60	------	----
0.50–0.69	------	------	------	------	------	----	------	------	------	------	------	60	------	----
0.70–0.99	------	------	------	------	------	----	------	------	10	------	10	60	------	----
1.00	------	------	------	------	------	----	------	------	10	------	5	60	------	----
20° to 25° C.														
0.010–0.025	>120	>120	>120	>120	>120	----	------	------	>60	------	------	>60	------	----
0.026–0.035	>120	>120	5	>120	>120	----	>60	>60	------	>60	------	60	------	60
0.036–0.045	1	>120	3	15	120	----	>60	------	>60	------	------	60	------	60
0.046–0.055	1	15	1	60	3	60	------	------	------	60	60	60	>60	[1]60
0.056–0.070	1	90	1	3	3	10	20	5	20	------	------	60	------	60
0.071–0.099	[1]1	1	------	3	3	[1]10	10	5	20	60	------	[1]60	------	----
0.10–0.29	1	3	------	1	------	10	5	3	20	60	5	60	60	20
0.30–0.39	------	------	------	------	------	----	------	------	5	------	3	20	20	10
0.40–0.49	------	------	------	------	------	----	------	------	5	10	3	10	20	5
0.50–0.69	------	------	------	------	------	----	------	------	3	------	3	10	20	5
0.70–0.99	------	------	------	------	------	----	------	------	3	------	3	5	10	3
1.00	------	------	------	------	------	----	------	------	1	------	1	10	10	3

[1] Interpolated figure.
[2] One typical colony found on 2-hour plate after 10-, 15-, 30-, 60-, and 90-minute tests were sterile.

DISCUSSION OF RESULTS

For purposes of discussion of the results obtained and of demonstrating the influence of certain variable factors on the resistance of the vegetative cells of bacteria to free chlorine, portions of the data presented in the tables have been shown graphically. Because of the number of variables involved, all of the data concerned with one variable could not be shown in any one chart without confusion. Conse-

quently, the data selected for presentation in the charts, though demonstrating the particular point in question, may not meet the full requirements of a particular situation. For example, in some of the charts are shown the effects of pH and of temperature on the survival of certain bacteria when exposed to free chlorine for periods of 5 and 10 minutes. The inclusion of corresponding data for time periods of 1, 3, 20, and 60 minutes in these charts would have made them too complicated. If the data plotted do not fit the particular needs of the reader in this respect, other data may be selected from the tables and similarly plotted.

EFFECT OF TIME OF EXPOSURE

In figures 1A to 1D, inclusive, the percentage survival of *Esch. coli* is plotted against time in minutes for four different hydrogen-ion concentrations, in two divergent temperature ranges. In figure 1A it is noted that at pH 7.0, 0.02 p.p.m. of free chlorine was not sufficient to produce a 100-percent kill at either temperature during a 60-minute period of exposure, whereas it did produce an approximately 80-percent kill in 5 minutes at room temperature, with no further kill thereafter, and a more gradual kill at 2° to 5° C. of about 23 percent during the first hour. Under the same conditions, however, 0.04 p.p.m. effected a 100-percent kill in 1 minute at the higher temperature and 0.05 p.p.m. a 100-percent kill in 3 minutes at the lower temperature. Thus at pH 7.0 and at temperatures ranging from 2° to 25° C. the critical effective dosage of free chlorine for *Esch. coli* is indicated to be in the range of 0.02 to 0.05 p.p.m., with 0.02 p.p.m. definitely shown to be insufficient to produce a 100-percent kill under the most favorable conditions. The critical dosage is probably 0.03 to 0.04 p.p.m.

Similarly in figures 1B, 1C, and 1D are shown corresponding results of averages for *Esch. coli* obtained at pH 8.5, 9.8, and 10.7 respectively. At pH 8.5, sharp reductions were observed with 0.05 and 0.07 p.p.m. of chlorine at both temperatures, the rate of decline varying with the amount of chlorine and the temperature. The indicated rate was slowest with 0.05 p.p.m. at 2° to 5° C. producing about an 80-percent kill in 10 minutes, 99 percent in 20 minutes, and 100 percent sometime between 20 minutes and 1 hour. With 0.07 p.p.m. a 100-percent kill was obtained in 10 minutes at 20° to 25° C., and in 20 minutes at 2° to 5° C. Thus at pH 8.5 at least 0.07 p.p.m. of chlorine was required to obtain a 100-percent kill of *Esch. coli* in 10 to 20 minutes in the temperature ranges covered.

In figure 1C, at pH 9.8 chlorine concentrations of 0.05 and 0.04 p.p.m. at 2° to 5° C. and 20° to 25° C., respectively, were quite inadequate to produce a 100-percent kill even in 60 minutes. It is observed also that the rate of kill for these chlorine concentrations at this pH, though faster at the higher temperature, was much more gradual than was observed at pH 7.0 and 8.5. In fact, the rates at these two con-

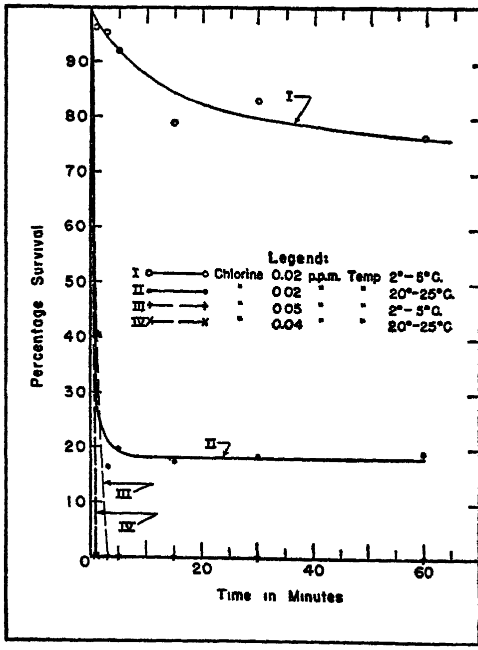

FIGURE 1A.—Percentage survival of *Esch. coli* exposed to chlorine in various concentrations, at pH 7.0, and at two temperatures, 2°–5° C. and 20°–25° C.

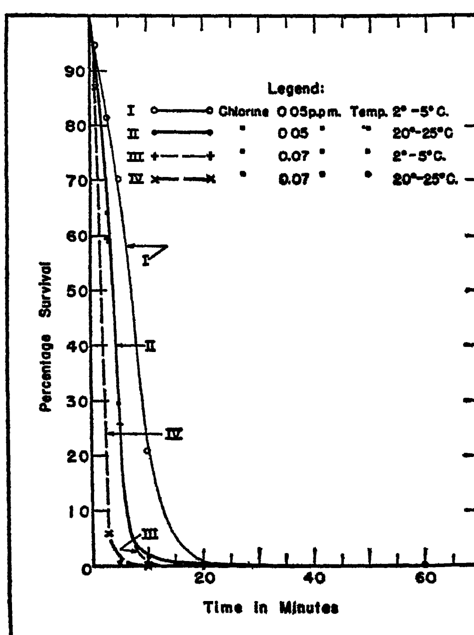

FIGURE 1B.—Percentage survival of *Esch. coli* exposed to chlorine in various concentrations, at pH 8.5, and at two temperatures, 2°–5° C. and 20°–25° C.

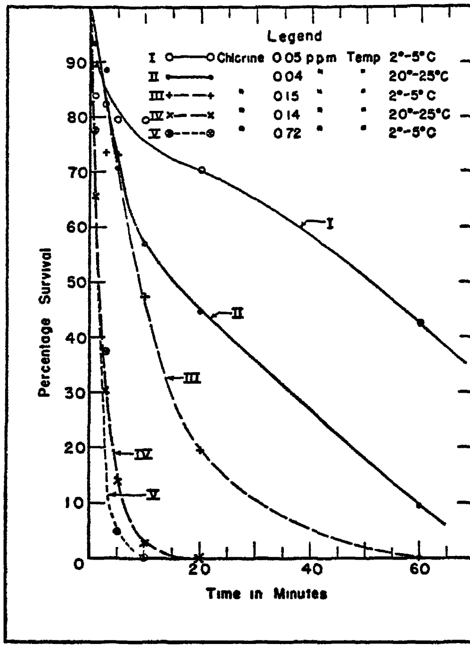

FIGURE 1C.—Percentage survival of *Esch. coli* exposed to chlorine in various concentrations, at pH 9.8, and at two temperatures, 2°–5° C. and 20°–25° C.

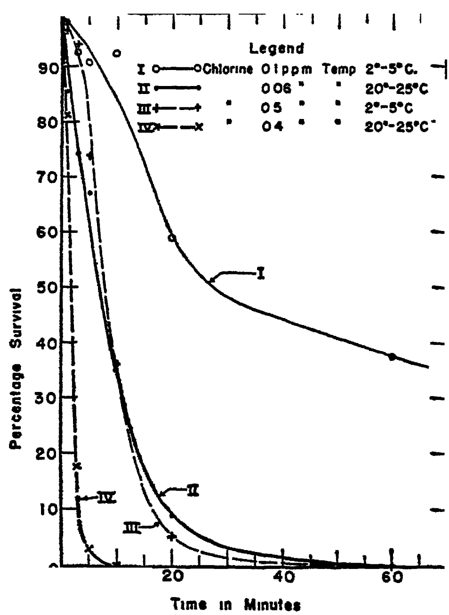

FIGURE 1D.—Percentage survival of *Esch. coli* exposed to chlorine in various concentrations, at pH 10.7, and at two temperatures, 2°–5° C. and 20°–25° C.

centrations of chlorine as indicated by curves I and II of figure 1C and at 0.15 p.p.m. at 2° to 5° C. (curve III) were so gradual they do not suggest the effect of an active bactericidal agent such as chlorine. At this pH, 9.8, it was necessary to increase the chlorine concentration to 0.15 p.p.m. at 20° to 25° C. and to 0.72 at 2° to 5° C. before the rate of decrease of *Esch. coli* became sufficiently rapid to bring about a 100-percent kill in 10 to 20 minutes.

In curves I, II, and III of figure 1D, prepared from the average results obtained with waters at pH 10.7, the same gradual decrease in the numbers of *Esch. coli* is observed. This is particularly marked in curve I, where, with 0.1 p.p.m. of chlorine present, about 90 percent of the *Esch. coli* survived for 10 minutes, 59 percent for 20 minutes, and 38 percent remained alive after 1 hour of exposure at 2° to 5° C. It was only when 0.4 p.p.m. of chlorine was used at 20° to 25° C. that a bacterial kill of 100 percent occurred in 10 minutes, and at 2° to 5° C. a residual of 0.5 p.p.m. apparently required about 60 minutes to produce a 100-percent kill.

EFFECT OF pH VARIATION

Figures 2A, 2B, and 2C are presented to show the effect of various hydrogen-ion concentrations on the bactericidal efficiency of free chlorine. In these, to avoid complication, the time variable has been omitted from consideration, all results presented being those obtained after a 10-minute exposure, and the percentages of survival in waters of pH 7.0, 8.5, 9.8; and 10.7 being plotted against residual chlorine expressed in p.p.m. In figures 2A and 2B results are shown for *Esch. coli* at 2° to 5° C. and at 20° to 25° C., respectively. Results obtained with *E. typhosa* at pH 7.0 and 9.8 are presented for both temperature ranges in figure 2C. The marked effect of pH on bactericidal efficiency is clearly indicated. For instance, in figure 2A with results from waters held at 2° to 5° C. a 100-percent kill of *Esch. coli* was obtained at pH 7.0 with 0.03 p.p.m. of chlorine, while for the same kill at pH 8.5, 9.8, and 10.7 concentrations of chlorine of 0.14, 0.72, and more than 1.0 p.p.m., respectively, were required. In the temperature range of 20° to 25° C. (fig. 2B), the pH effect was not so marked, but at pH 7.0, 8.5, 9.8, and 10.7 chlorine concentrations of 0.04, 0.07, 0.3, and 0.4 p.p.m., respectively, were required to obtain a 100-percent kill in 10 minutes. From figure 2C it is noted that in order to obtain a 100-percent kill of *E. typhosa* at 2° to 5° C. in 10 minutes at pH 7.0, only 0.03 p.p.m. was needed, whereas at pH 9.8, 0.4 to 0.74 p.p.m. was required. In the 20° to 25° C. temperature range with *E. typhosa*, under otherwise similar conditions, 0.06 p.p.m. of chlorine at pH 7.0 and 0.16 p.p.m. at pH 9.8 were required to obtain the same results.

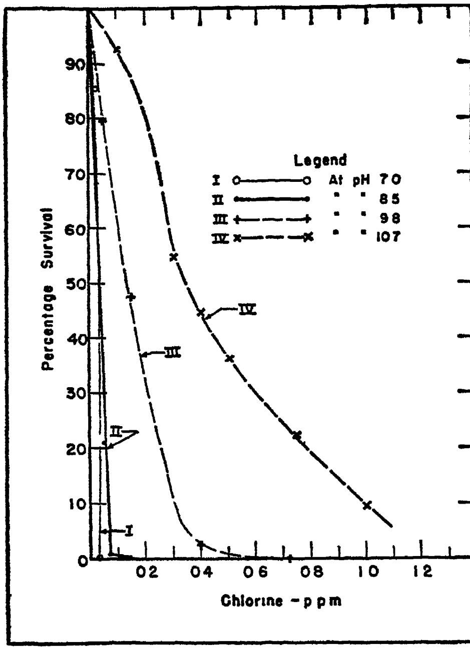

FIGURE 2A.—pH effect on survival of *Esch coli* exposed to chlorine in various concentrations for 10 minutes at 2°–5° C.

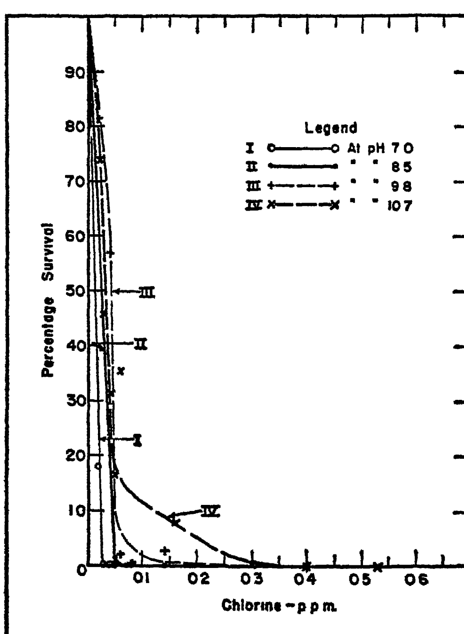

FIGURE 2B.—pH effect on survival of *Esch coli* exposed to chlorine in various concentrations for 10 minutes at 20°–25° C.

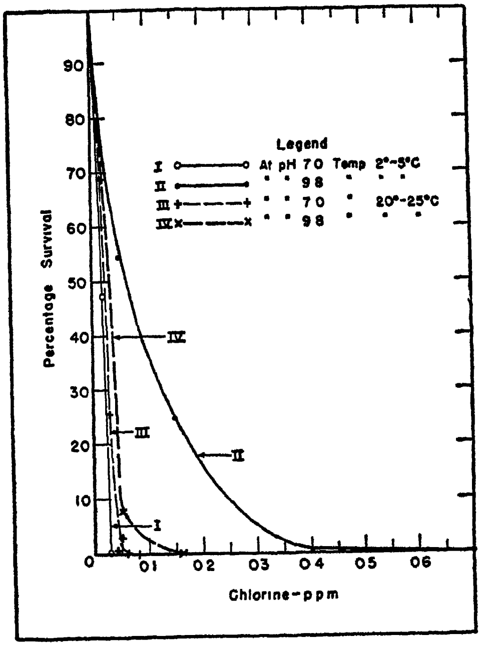

FIGURE 2C.—pH effect on survival of *Eber. typhosa* exposed to chlorine in various concentrations for 10 minutes at two temperatures, 2°-5° C. and 20°-25° C.

INFLUENCE OF TEMPERATURE VARIATION

The influence of variation in temperature on the bactericidal efficiency of chlorine is illustrated in figures 3A, 3B, and 3C. To avoid confusion in the lines on the charts the time variable has been omitted and only the results for the 5-minute exposure time plotted. The *Esch. coli* data have been divided for the same reason, the results obtained at pH 7.0 and 8.5 being presented in figure 3A and at pH 9.8 and 10.7 in figure 3B. At pH 7.0, the influence of temperature on the *Esch. coli* kill was not marked except at a residual of 0.02 p.p.m. With residuals of 0.03 p.p.m. and over the results obtained at each temperature were approximately identical. At pH 8.5, however, a marked difference was observed in the extent of kill with equivalent chlorine residuals at the two temperature ranges. For instance, though a 100-percent kill was produced by 0.07 p.p.m. at 20° to 25° C., 0.14 p.p.m. or more of residual chlorine was required at 2° to 5° C. At both pH 7.0 and 8.5 the rate of kill of *Esch. coli* was slower at the lower temperature.

At pH 9.8 and 10.7, the temperature effect was much more marked throughout the range of chlorine concentrations tried, that is, from 0.02 to 1.0 p.p.m. For example, at pH 9.8 a chlorine residual of 0.3 p.p.m. produced a 100-percent kill of *Esch. coli* at 20° to 25° C. in 5 minutes, whereas 1.0 p.p.m. was required to accomplish the same result

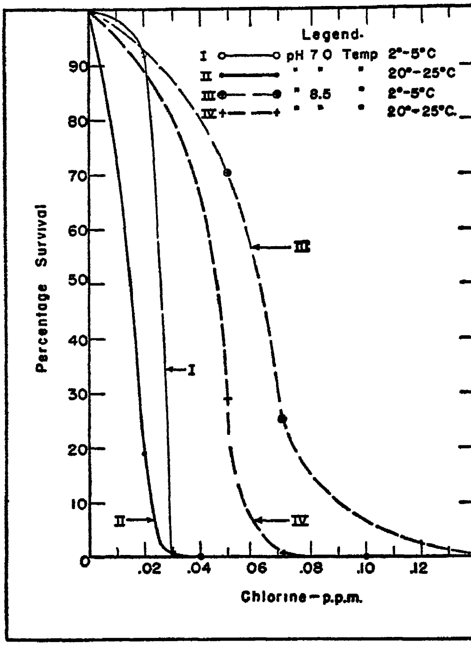

Figure 3A.—Influence of temperature on the survival of *Esch. coli* when exposed to chlorine in various concentrations for 5 minutes at pH 7.0 and at pH 8.5.

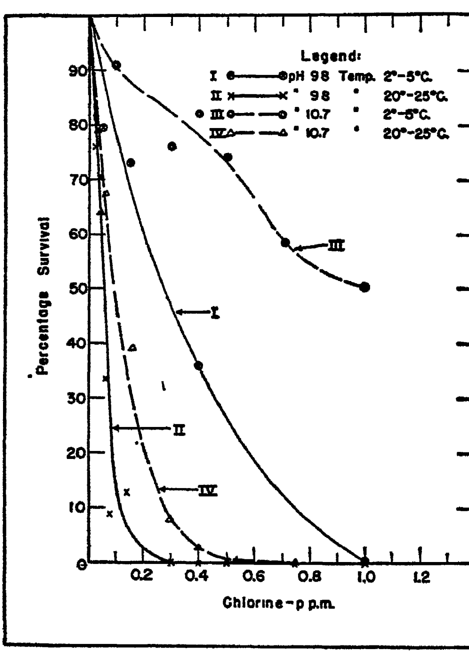

Figure 3B.—Influence of temperature on the survival of *Esch. coli* when exposed to chlorine in various concentrations for 5 minutes at pH 9.8 and at pH 10.7.

at 2° to 5° C. Similarly at pH 10.7 about 0.4 p.p.m. produced a 100-percent kill in 10 minutes at 20° to 25° C., but 1.0 p.p.m. at 2° to 5° C. required about 60 minutes to produce a similar result.

In a similar manner, the influence of temperature on the bactericidal efficiency of chlorine for *E. typhosa* at pH 7.0 and 9.8 is shown in figure 3C. At pH 7.0, temperature apparently has but slight influence on the toxicity of chlorine for *E. typhosa* but strange as it may seem the slight effect indicated was in the direction of an increased sensitivity at the lower temperature, just the reverse of the effect on other species

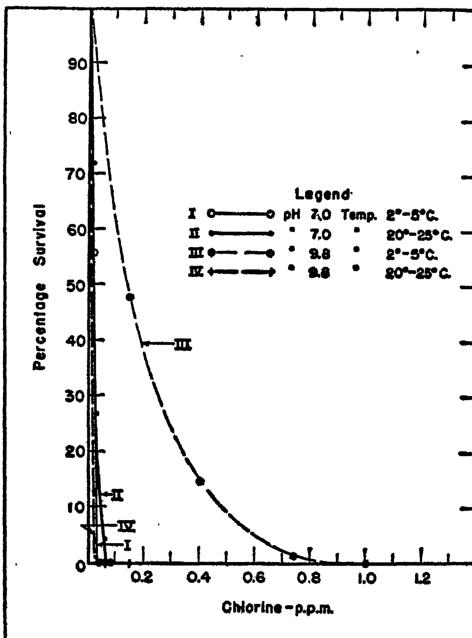

FIGURE 3C.—Influence of temperature on the survival of *Eber. typhosa* when exposed to chlorine in various concentrations for 5 minutes at pH 7.0 and at pH 9.8.

studied. At pH 9.8, however, a 100-percent kill of *E. typhosa* was obtained in 3 minutes at 20° to 25° C. with 0.3 p. p. m. (99.4 percent with 0.16 p. p. m.) of chlorine, whereas at 2° to 5° C. about 1.0 p. p. m. was required to obtain the same result.

VARIATIONS IN GENUS SENSITIVITY

Variations in the sensitivity to chlorine of the different species of the genera studied are shown in figures 4A to 4E, inclusive. In these charts the percentage survival of the various genera is plotted against chlorine residuals. Results obtained after an exposure time of 5 minutes only were used in all cases. This 5-minute period was selected because maximum differences were observed at this interval. With longer times, the differences in sensitivity tended to be reduced mark-

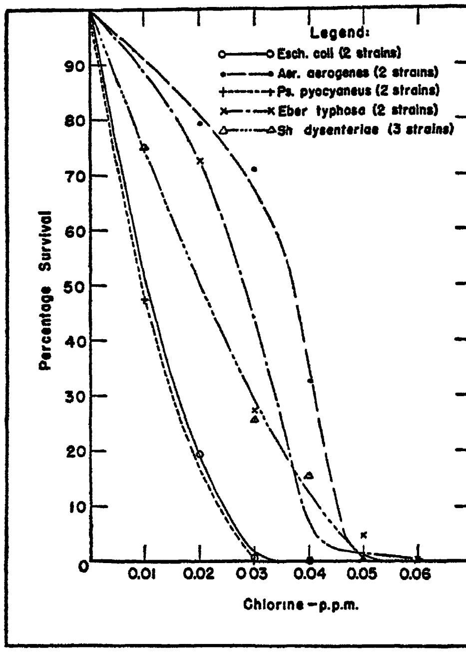

FIGURE 4A.—Relative survival of five species when exposed to chlorine in various concentrations for 5 minutes at 20°–25° C., and at pH 7.0.

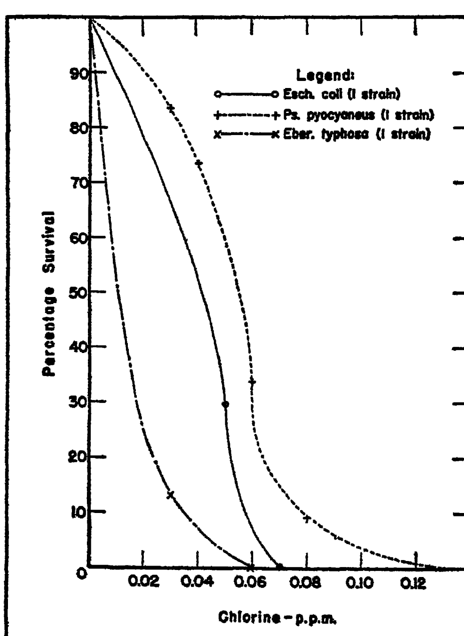

FIGURE 4B.—Relative survival of three species when exposed to chlorine in various concentrations for 5 minutes at 20°–25° C., and at pH 8.5.

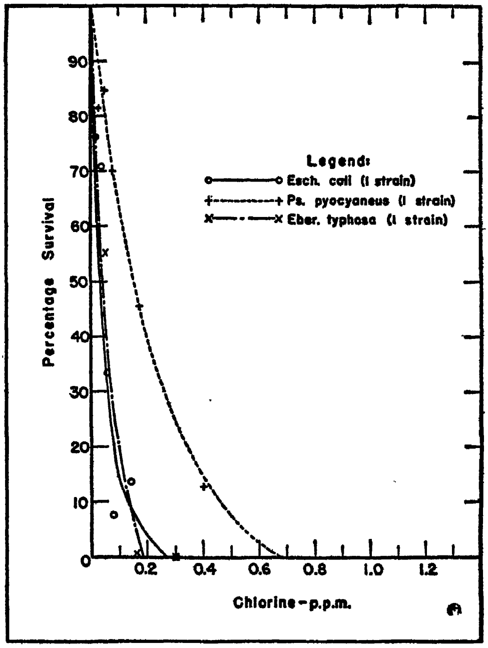

FIGURE 4C.—Relative survival of three species when exposed to chlorine in various concentrations for 5 minutes at 20°–25° C., and at pH 9.8.

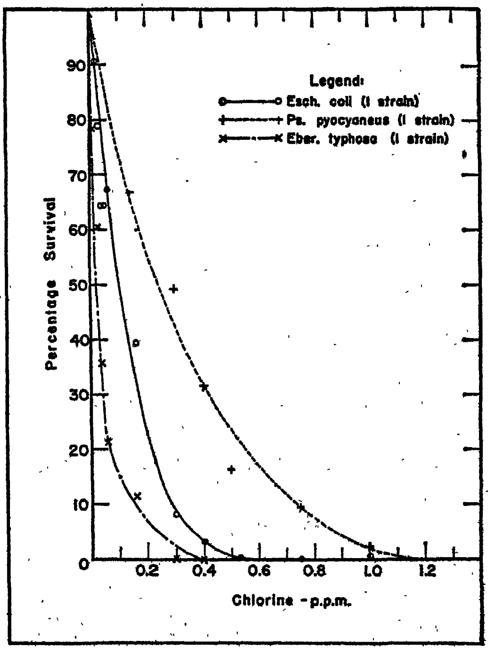

FIGURE 4D.—Relative survival of three species when exposed to chlorine in various concentrations for 5 minutes at 20°–25° C., and at pH 10.7.

edly. In general, however, the trends observed at the 5-minute exposure period (with two exceptions, *E. typhosa* and *Ps. pyocyanea* which will be discussed below) held throughout the range of the observations. Five genera were tested at pH 7.0 but at pH 8.5, 9.8, and 10.7 only three genera were studied.

In figure 4A, showing results obtained with five genera at pH 7.0 and a temperature range of 20° to 25° C., *A. aerogenes* was the most resistant, with *E. typhosa, S. dysenteriae, Esch. coli,* and *Ps. pyocyanea* following in order. The latter genus was only slightly more sensitive

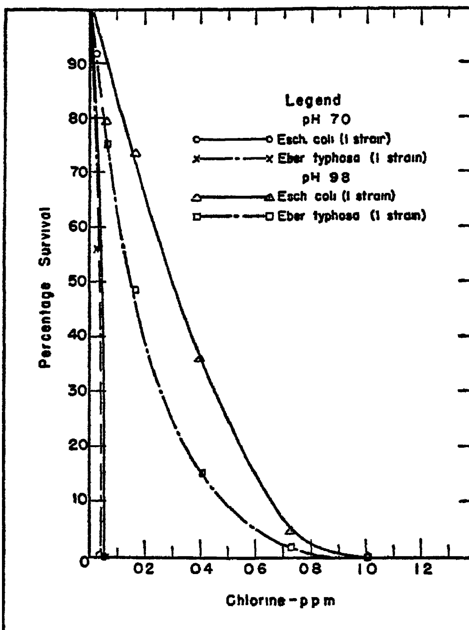

FIGURE 4E.—Relative survival of two species when exposed to chlorine in various concentrations for 5 minutes at 2°–5° C, and at pH 7 0 and pH 9.8.

than *Esch. coli.* In figure 4B, results obtained at pH 8.5 and at 20° to 25° C. after 5 minutes of exposure to chlorine show that *E. typhosa* was the most sensitive, *Esch. coli* next, and *Ps. pyocyanea* the least sensitive of the three genera tested, for which 0.06, 0.1, and 0.15 p. p. m. of chlorine, respectively, were required to produce a 100-percent kill in 5 minutes. In figure 4C, presenting results for the same three genera under identical conditions except that the pH was 9.8, *E. typhosa* was again the most sensitive and *Ps. pyocyanea* the most resistant. At this pH, however, the difference in sensitivity of *Esch. coli* and *E. typhosa* was not marked. Similar data obtained at pH 10.7, as shown in figure 4D, indicated again the same order of relative sensitivity. At this pH, 10.7, and temperature, 20° to 25° C., a 100-percent kill in 5 minutes required for *E. typhosa* about 0.4 p. p. m., for

Esch. coli about 0.8 p.p.m., and for *Ps. pyocyanea* more than 1.0 p. p. m. of chlorine. In figure 4E results obtained after 5 minutes of exposure to chlorine with two genera, *Esch. coli* and *E. typhosa*, at two pH zones, 7.0 and 9.8, and at low temperature, 2° to 5° C., are shown. At pH 7.0, under these conditions, the two genera were about equally sensitive, with *Esch. coli* appearing to be slightly more resistant, though the difference was insignificant. At pH 9.8, however, *Esch coli* was definitely more resistant to chlorine than *E. typhosa*.

Reference is made now to the exceptions noted for *E. typhosa* and *Ps. pyocyanea*. From the results as shown in tables 1 and 4 and in figure 4A, it is clearly indicated that at pH 7.0 and at 20° to 25° C. the strains of *E. typhosa* tested were slightly more resistant than *Esch. coli* to chlorine at all concentrations tried. It is also noted that for all tests conducted at the higher pH zones, figures 4B to 4D, the *E. typhosa* strains were less resistant to chlorine than *Esch. coli*. This suggests that a variation in sensitivity to chlorine for certain bacterial species may exist at different hydrogen-ion concentrations. This observation was made after the tables and figures for this report had been prepared. To obtain more information on this point additional exploratory tests with *Esch. coli* and *E. typhosa* were made at pH 6.5 and 7.8, with a temperature range of 20° to 25° C. The results obtained from these additional tests tended to confirm the observation concerning a probable shift in sensitivity with pH. At pH 6.5 *E. typhosa* was definitely more resistant to chlorine than *Esch. coli*. At pH 7.8 the same condition prevailed at the lowest concentrations of chlorine tried, 0.02 to 0.03 p.p.m., but at greater concentrations, 0.06 p.p.m. or more, *Esch. coli* became slightly more resistant than *E. typhosa*. Thus it would appear, on the basis of this evidence, that there is a reversal in the relative sensitivity of *E. typhosa* and *Esch. coli* to chlorine somewhere in the pH range of 7.8 to 8.5. A similar indication is noted in the results obtained with *Ps. pyocyanea* strains. At pH 7.0 these strains were the most sensitive to chlorine of all species tested, whereas at pH 8.5, 9.8, and 10.7 they were in all cases the most resistant. A final conclusion on this matter must be held in abeyance, however, until additional tests at other pH zones and with a much larger number of bacterial strains have been made.

TIME REQUIRED TO PRODUCE A 100-PERCENT KILL

Data are presented in table 6 showing the time required to produce a 100-percent kill of the various bacteria studied when exposed to free chlorine in varying concentrations at the four pH zones and two temperature ranges investigated. Certain apparent discrepancies in these results are noted. For instance, with *A. aerogenes* at pH 7.0 and a temperature range of 20° to 25° C. a chlorine concentration of about 0.046 to 0.055 p.p.m. produced a 100-percent kill in 15 minutes in one

experiment, whereas in another experiment 90 minutes were required to produce the same results with about 0.056 to 0.07 p.p.m. of chlorine. A similar inconsistency was observed for *E. typhosa* at pH 7 0 and 20° to 25° C. for chlorine ranges of about 0.036 to 0.045 and 0.046 to 0.055

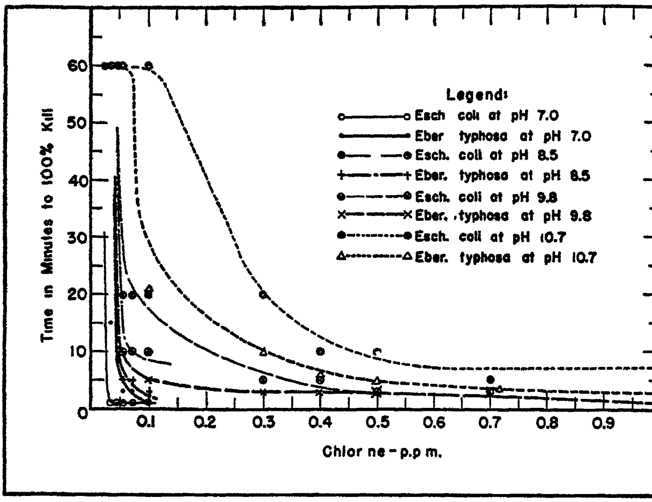

FIGURE 5A.—Minutes required to produce 100-percent kill of *Esch. coli* and *Eber. typhosa* at 20°–25° C. when exposed to chlorine in various concentrations, and at various hydrogen-ion concentrations.

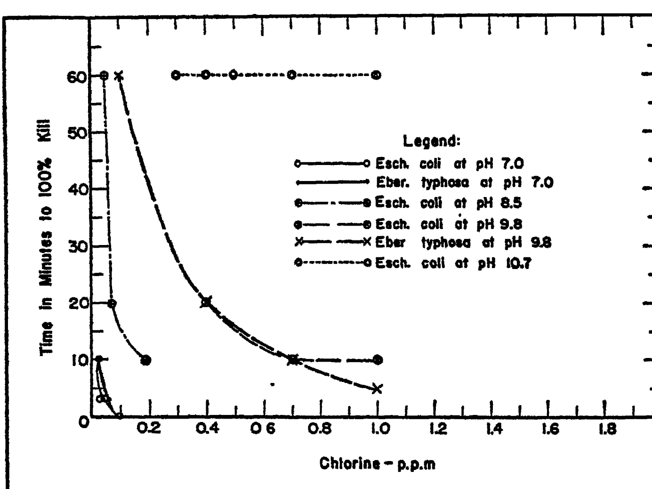

FIGURE 5B.—Minutes required to produce 100-percent kill of *Esch. coli* and *Eber. typhosa* at 2°–5° C. when exposed to chlorine in various concentrations, and at various hydrogen-ion concentrations.

p.p.m. No explanation for these inconsistencies is advanced other than to suggest that this is the type of normal variation which must be expected in repeating tests with biological forms exposed to a considerable number of variables. Such results tend to emphasize the neces-

sity of always allowing a reasonable factor of safety in the required concentrations of bactericidal agents.

To compare the time required with various chlorine concentrations in order to produce a 100-percent kill of *Esch. coli* and *E. typhosa* in the four pH zones studied, the data for these two genera have been plotted in figures 5A and 5B for results obtained at 20° to 25° C. and 2° to 5° C., respectively. Similar comparison may be made with the other genera studied by plotting the data given in table 6.

It is noted from figure 5A that at pH 7.0 and at a temperature range of 20° to 25° C. *Esch. coli* was apparently more sensitive to chlorine than *E. typhosa* until a chlorine concentration of about 0.1 p. p. m. or more was reached. At pH 8.5, 9.8, and 10.7 in the same temperature range, however, *E. typhosa* was found to be equally or more sensitive to chlorine than *Esch. coli* This apparent reversal of sensitivity to chlorine with changing pH has been reviewed in the discussion of the data of the series 4 figures. Although factual information to support the theory is not available, it might be suggested that the capsular substance of the more heavily encapsulated typhosa organisms may become less permeable to chlorine in the lower pH range and that under such conditions the more sensitive cell is not penetrated as readily until higher concentrations of chlorine are used.

It is of interest to observe also that to produce a 100-percent kill of *Esch. coli* at 20° to 25° C. with a chlorine concentration of about 0.046 to 0.055 p. p. m. it required 1 minute at pH 7.0, and at pH 8.5, 9.8, and 10.7 between 20 and 60 minutes of exposure, or at least twenty times the exposure time required under the same conditions at pH 7.0. With a higher concentration of chlorine, 0.1 to 0.29 p. p. m. and also 20° to 25° C. a 100-percent kill of *Esch. coli* at pH 7.0, 8.5, 9.8, and 10.7 required an exposure time of 1,[2] 10, 20, and 60[2] minutes, respectively. Considering the results for *E. typhosa*, a similar pH effect is noted. With a chlorine concentration of 0.1 to 0.29 p.p.m., exposure times of 1, 3, 5, and 20 minutes, respectively, were required to obtain a 100-percent kill at 20° to 25° C. with pH values of 7.0, 8.5, 9.8, and 10.7. Thus under the same conditions of chlorine concentration (0.1 to 0.29 p. p. m.) and temperature range (20° to 25° C.) at the four pH zones of 7.0, 8.5, 9.8, and 10.7, exposure times of 1, 10, 20, and 60 minutes, and 1, 3, 5, and 20 minutes, respectively, were required to produce a 100-percent kill of *Esch. coli* and *E. typhosa.* Similar comparisons of the increasing chlorine concentrations required, with decreasing hydrogen-ion concentrations, to produce a 100-percent kill during the same interval of time may be read from figure 5A and table 6. For instance, it is noted that from ten to thirty times as

[2] In this connection it should be observed that actually a 100-percent kill was obtained probably in less than 1 minute (the minimum observation interval) at pH 7.0 as 0 036 to 0 045 p. p. m (about one-third the chlorine concentration used here) also produced a 100-percent kill in 1 minute. Similarly at pH 10.7 the time of the 100-percent kill may have been somewhat less than 60 minutes as examinations were not made between the 20- and 60-minute periods.

much chlorine was required at pH 9.8 to obtain a 100-percent kill of *Esch. coli* and *E. typhosa* in the same time interval as was required at pH 7.0.

In figure 5B, similar results are presented for *Esch. coli* and *E. typhosa* with chlorine in various concentrations in the same four pH zones but at a temperature range of 2° to 5° C. With this lower temperature, at pH 7.0, 0.1 p. p. m. of chlorine was required to produce a 100-percent kill of *Esch. coli* in 1 minute, whereas slightly less, 0.08 p. p. m., was required for *E. typhosa.* At pH 9.8 and 10.7, but otherwise under the same conditions, 100-percent kills were not obtained in 1 minute with 1.0 p. p. m. of chlorine with either species, 10 minutes being required with this concentration at pH 9.8 and 60 minutes at pH 10.7 for *Esch. coli,* whereas *E. typhosa* were all killed by this concentration of chlorine in 5 minutes at pH 9.8.

Similar comparison of the influence of temperature variation (table 6) indicates that in the lower temperature range the period of exposure required to effect a 100-percent kill of *Esch. coli* was two to twelve times as long as in the higher range of 20° to 25° C., or the concentration of chlorine required for a 100-percent kill in the same period of exposure was two to ten times greater in the lower than in the higher temperature range.

MAXIMUM AND MINIMUM PERCENTAGE OF SURVIVAL

The value of the results presented naturally depends on (1) the care and the technique used in obtaining them, and (2) the inherent differences occurring between individual observations, particularly as induced by biological variations in resistance. Consideration of the care and technique used has been covered fully in the discussion of methods. Although a critical statistical analysis of the results presented is not within the province of this report, some conception of the variations observed may be realized from a review of the maximum and minimum percentages of survival obtained. A tabulation of such percentages has been prepared and studied, for each time interval and each chlorine concentration, under all of the conditions investigated. In general, as would be anticipated, the greatest differences between the maximum and the minimum results were encountered when the extent of bacterial kill was the least; that is, when the amounts of chlorine used were the smallest and when other conditions reduced the bactericidal properties of chlorine.

To illustrate these variations, the maximum and minimum percentages of survival after 5 minutes of exposure at a temperature range of 2° to 5° C. are shown for *Esch. coli* and *E. typhosa* in figure 6A as obtained at pH 7.0 and in figure 6B as obtained at pH 9.8. It is noted that the greatest differences are shown with the lowest chlorine concentrations and that in this range greater differences were observed with *E. typhosa* than with *Esch. coli;* also that with increased chlorine

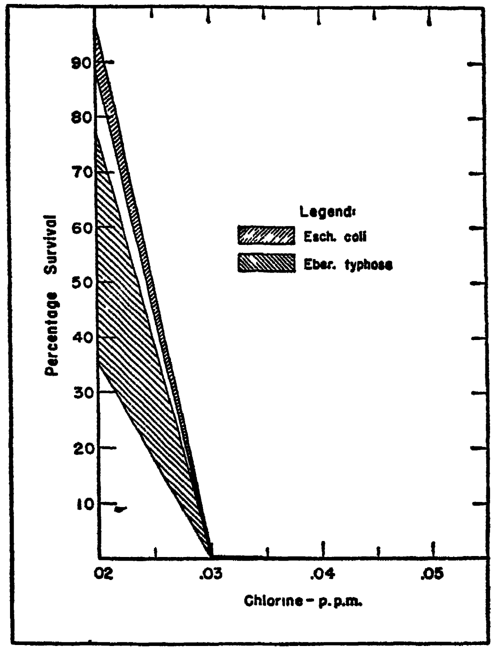

FIGURE 6A.—Maximum and minimum percentage survival of two species in various chlorine concentration ranges after 5 minutes' exposure at pH 7 0 and 2°-5° C.

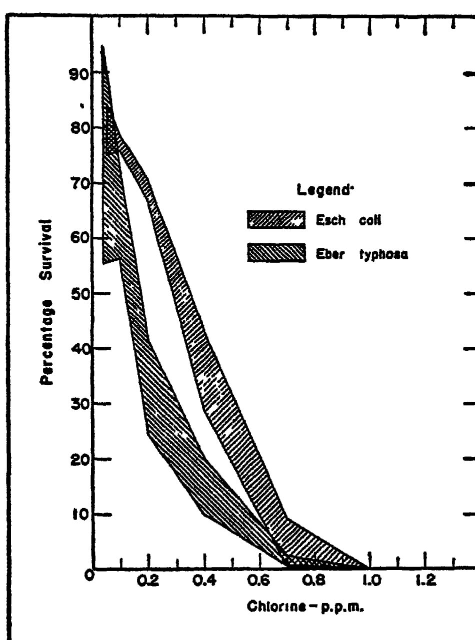

FIGURE 6B.—Maximum and minimum percentage survival of two species in various chlorine concentration ranges after 5 minutes' exposure at pH 9.8 and 2°-5° C.

concentrations the differences between the maximum and minimum percentages of survival decrease and that under such conditions differences for *E. typhosa* tended to become equal to or less than those for *Esch. coli*. Similar differences, but in general of lesser magnitude, were observed in the results obtained in the temperature range of 20° to 25° C. It is believed that the variations observed are within the range which would be expected and that they warrant fully the limited deductions made.

CONCLUSIONS

Observations on the relative survival of *Esch. coli, A. aerogenes, Ps. pyocyanea, E. typhosa,* and *S. dysenteriae,* when exposed to free chlorine in waters of four different hydrogen-ion concentrations, pH 7.0, 8.5, 9.8, and 10.7, and at two temperature ranges, 2° to 5° C., and 20° to 25° C., are presented. The results indicate: (1) the time of exposure of bacteria to free chlorine is a primary factor governing the extent of the bacterial kill; (2) hydrogen-ion concentration has a marked effect on the bactericidal efficiency of free chlorine, the killing power diminishing with increasing pH values; (3) increase in temperature tends to increase the bactericidal properties of free chlorine. When the effect of a lowered temperature is superimposed on a high pH, the reduction in the bactericidal efficiency of free chlorine is very marked; (4) at pH zones of 8.5, 9.8, and 10.7 strains of *E. typhosa* tested were more sensitive to chlorine than *Esch. coli* or *Ps. pyocyanea*. At pH 6.5, 7.0, and 7.8, with free chlorine concentrations of 0.03 p. p. m. or less, *E. typhosa* appeared to be slightly more resistant than *Esch. coli* or *Ps. pyocyanea.*

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COURT DECISIONS ON PUBLIC HEALTH

City tourist camp ordinance held to conflict with State trailer park law.—(Michigan Supreme Court; *Richards et al.* v. *City of Pontiac et al.*, 9 N.W.2d 885; decided June 7, 1943.) In March 1941 the city of Pontiac adopted an ordinance relating to tourist camps. This ordinance, among other things, required a license, the fee for which was $10 per year for each unit capacity of the camp, and provided that "Any occupied camp and/or trailer or house tent may be located at any regularly licensed tourist camp * * * for a period not to exceed three months in any 12-month period." In 1939 the Michigan legislature enacted a statute regulating trailers and trailer camps within townships, and in 1941 this law was amended to provide for the regulation of house-trailer camps in all parts of the State.

The plaintiffs owned a trailer camp in Pontiac, and in September 1941 brought suit to enjoin the city from interfering with their camp under the provisions of the tourist camp ordinance. The director of public health of the city, by cross-bill, sought to have the plaintiffs restrained from using their property as a trailer camp and from renting trailers and substandard houses. The plaintiffs claimed that the ordinance conflicted with the above-mentioned statute and the State supreme court sustained their contention. Concerning the law, the court said that it was enacted because of a shortage of habitable houses for defense workers and was designed to regulate the trailer type of housing and intended to apply to trailers as permanent, as well as temporary, dwellings. It provided for a monthly license fee of $1.50 for each occupied trailer coach occupying space and permitted a trailer coach to remain in a given location for an indefinite length of time. Its intent and purpose, according to the court, was to take over the entire field of regulation and supervision of trailer parks in the State. After citing a prior case in which it was stated to be the rule that, in the absence of specific statutory or charter power in the municipality, the provisions of an ordinance which contravened a State law were void, the supreme court pointed out that the ordinance conflicted with the statute, and was therefore void, in the following respects: The State law permitted unlimited parking of trailers while the ordinance fixed a time limit for such parking; the ordinance required an annual license fee of $10 for each unit capacity of the camp while the law provided for a different license fee. Concerning the latter aspect of the conflict, the court said that "The State having entered the field of licensing tourist camps, any provision for additional fees, imposed by an ordinance for such licensing, is void."

With reference to the State housing law, the court took judicial notice of the fact that when this law was enacted in 1917 the problems

arising out of trailer camps were not a matter requiring legislation and that it was not intended that the act would apply to the construction of trailers and trailer camps. Also, the legislature did not intend to repeal the housing law by enacting the trailer-park law.

Answering the contention that a city zoning ordinance, as amended, required elimination of the plaintiffs' trailer camp from its present location, the court said that the plaintiffs, having purchased the property, expended money thereon, and operated a trailer camp prior to the existence of either of the zoning ordinances, had a vested right to operate such trailer camp in accordance with the State statute or as such statute might be amended.

The trial court's decree, granting a permanent injunction against interference with the plaintiffs by virtue of any authority contained in the ordinance, was affirmed.

Uniform narcotic drug act—earlier law impliedly repealed by—marihuana included under.—(Nevada Supreme Court; *State* v. *Economy*, 130 P.2d 264; decided October 20, 1942.) In this case one of the conclusions reached by the Supreme Court of Nevada was that the State Narcotic Drug Act of 1923, as amended, was impliedly repealed by the Uniform Narcotic Drug Act enacted by the State legislature in 1937. While the later act contained no specific repealing clause but provided in general terms that inconsistent acts or parts of acts were repealed, the court pointed out that it was in effect a revision of the earlier law and was a complete system for regulating the possession, use, sale, distribution, or administration of narcotic drugs.

Another point decided by the court was that, while the 1937 uniform law did not name marihuana as a narcotic drug, the definition of cannabis in such law embraced marihuana. The statute denominated cannabis as a narcotic drug and defined it as including "the following substances under whatever names they may be designated: (*a*) the dried flowering or fruiting tops of the pistillate plant Cannabis sativa L., from which the resin has not been extracted, (*b*) the resin extracted from such tops, and (*c*) every compound, manufacture, salt, derivative, mixture, or preparation of such resin, or of such tops from which the resin has not been extracted." Under all authorities, said the court, this definition embraces marihuana, which is a product of cannabis.

Public health law construed.—(New York Court of Appeals; *Fisher et al., Common Council,* v. *Kelly, Mayor,* 44 N.E.2d 413; decided October 16, 1942.) A local law of the city of Buffalo substituted a commissioner of health for a board of health. In a controversy concerning the validity of this local law the Court of Appeals of New York had occasion to construe the first sentence of section 20 of the State public health law, which provided: "There shall continue to be local boards of health and health officers in the several cities, villages

and towns of the State except as hereinafter provided." The court said that, though in its opinion this sentence was intended to apply to all cities of the State, it should not be construed as a requirement that in every city, village, and town there should be both a local board of health and a health officer. The court's view was that, reasonably construed, the sentence could mean only that local boards of health and local health officers were not abolished by the statute and that in each city, village, or town the duties conferred upon or required of local boards of health by the laws of the State should continue to be performed by a local health officer or board. So construed, the local law of the city of Buffalo was held not to be in conflict with such sentence. The court pointed out, however, that in other portions of section 20 and in section 21 of the public health law a form of organization was provided for certain cities and stated that "There is here no room for construction concerning the form of organization required in those cities which are included within the scope of these statutory provisions." The court held that such provisions had no application to the city of Buffalo.

DEATHS DURING WEEK ENDED DECEMBER 4, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 4, 1943	Corresponding week, 1942
Data for 87 large cities of the United States:		
Total deaths	9,565	9,499
Average for 3 prior years	8,742	
Total deaths, first 48 weeks of year	422,607	395,054
Deaths under 1 year of age	652	674
Average for 3 prior years	570	
Deaths under 1 year of age, 48 weeks of year	30,218	27,379
Data from industrial insurance companies:		
Policies in force	66,088,599	65,292,593
Number of death claims	12,132	12,811
Death claims per 1,000 policies in force, annual rate	9.5	10.2
Death claims per 1,000 policies 48 weeks of year, annual rate	9.6	9.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 11, 1943

Summary

A total of 23,746 cases of influenza was reported, or more than five times the preceding week's total of 4,489, and nearly nine times the median of 2,742 for the corresponding week of the past 5 years. The infection is reported to be of a mild type. Excessive incidence is noted in certain States of each geographic area except the New England, Middle Atlantic, and Pacific. Of the current total, 16,654 cases, or 70 percent, were reported in 5 States, as follows (last week's figures in parentheses): Iowa 2,337 (0), North Dakota 4,331 (23), Virginia 1,649 (651), Kentucky 5,416 (3), and Texas 2,921 (1,298). Preliminary reports from certain selected cities well distributed geographically show for the weeks ended December 4 and December 11 a slight excess mortality from influenza and pneumonia combined, as compared with figures for 1942 and averages for the past 3 years.

A slight increase in the incidence of meningococcus meningitis was recorded for the week. A total of 287 cases was reported, as compared with 274 for the preceding week and a 5-year median of 34. States reporting more than 8 cases (last week's figures in parentheses) are as follows: *Increases*—Massachusetts 16 (13), New York 41 (31), New Jersey 11 (10), Pennsylvania 34 (33), Ohio 16 (9), Illinois 22 (14), Missouri 12 (5), and California 26 (25); *decreases*—Michigan 11 (23). The cumulative total for the fourth quarter of the year to date is 2,290, as compared with 716 for the same period last year and a 5-year median of 326.

A total of 96 cases of poliomyelitis was reported, as compared with 141 for the preceding week and a 5-year median of 91. No State reported more than 14 cases.

Current figures for measles and scarlet fever are above the corresponding 5-year medians, while those for diphtheria, smallpox, typhoid fever, and whooping cough are below. The cumulative totals for 49 weeks of the year for measles and whooping cough are above the medians, while those for diphtheria, scarlet fever, smallpox, and typhoid fever are below.

Deaths recorded in 90 large cities for the week totaled 10,373, as compared with 9,845 last week and a 3-year (1940–42) average of 8,868. The cumulative total for the year to date is 445,120, as compared with 415,304 for the same period of 1942.

Telegraphic morbidity reports from State health officers for the week ended December 11, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Dec. 11, 1943	Dec. 12, 1942		Dec. 11, 1943	Dec. 12, 1942		Dec. 11, 1943	Dec. 12, 1942		Dec. 11, 1943	Dec. 12, 1942	
NEW ENGLAND												
Maine	3	1	1	22	------	1	98	7	40	0	6	0
New Hampshire	0	1	0	------	------	------	8	58	4	0	0	0
Vermont	0	0	0	------	------	------	34	109	23	0	0	0
Massachusetts	9	2	3	------	------	------	325	539	236	16	6	2
Rhode Island	0	0	1	1	1	------	67	20	2	4	3	0
Connecticut	2	0	1	98	2	2	8	235	59	5	4	1
MIDDLE ATLANTIC												
New York	16	22	16	70	[1] 16	[1] 12	600	430	509	41	11	3
New Jersey	4	3	10	50	10	8	405	25	17	11	5	1
Pennsylvania	11	11	21	13	5	------	410	747	495	34	10	3
EAST NORTH CENTRAL												
Ohio	14	11	19	4	17	14	2,035	36	36	16	8	1
Indiana	13	4	17	286	7	9	80	38	17	3	0	0
Illinois	5	10	34	447	9	9	174	69	28	22	3	1
Michigan [2]	9	7	7	63	2	2	673	38	173	11	0	0
Wisconsin	1	1	1	130	34	20	482	140	140	8	2	1
WEST NORTH CENTRAL												
Minnesota	9	5	5	396	1	2	437	5	33	1	0	0
Iowa	1	4	4	2,337	------	3	41	40	40	0	0	0
Missouri	6	5	9	137	1	2	22	6	6	12	1	0
North Dakota	2	1	2	4,331	1	10	380	0	17	0	0	0
South Dakota	1	0	4	------	------	------	71	55	1	0	1	0
Nebraska	2	4	2	------	21	------	6	83	4	0	0	0
Kansas	11	0	4	197	18	11	11	21	32	3	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	18	1	2	1	0	0
Maryland [2]	5	2	7	62	8	8	36	4	6	6	4	2
District of Columbia	0	2	2	245	7	2	28	3	1	1	0	0
Virginia	11	21	40	1,649	371	176	550	17	33	8	10	0
West Virginia	5	6	12	629	20	16	60	2	11	4	2	2
North Carolina	28	18	70	3	2	6	166	2	139	5	1	1
South Carolina	5	15	15	755	517	425	45	8	6	3	0	0
Georgia	7	5	19	676	116	116	55	3	27	3	1	0
Florida	4	7	8	16	1	6	23	0	2	1	2	0
EAST SOUTH CENTRAL												
Kentucky	3	8	16	5,416	3	6	6	22	22	6	0	0
Tennessee	9	8	13	285	40	30	20	7	21	3	0	1
Alabama	11	12	27	306	80	80	163	2	14	2	3	1
Mississippi [2]	9	7	12	------	------	------	------	------	------	0	0	1
WEST SOUTH CENTRAL												
Arkansas	9	15	18	427	87	99	28	22	18	1	0	0
Louisiana	6	7	9	84	13	12	1	3	3	2	0	1
Oklahoma	3	9	17	201	185	125	11	10	6	3	1	1
Texas	37	42	55	2,921	732	443	78	13	43	8	2	1
MOUNTAIN												
Montana	0	0	2	84	------	10	103	95	52	1	1	0
Idaho	0	4	0	2	------	------	1	8	8	1	0	0
Wyoming	1	0	1	11	50	8	19	10	3	1	0	0
Colorado	3	10	11	322	46	46	165	12	17	1	2	1
New Mexico	1	2	3	18	------	------	0	2	5	0	0	0
Arizona	9	1	1	950	110	127	12	4	4	1	0	0
Utah [2]	0	1	1	56	------	28	12	658	29	2	1	0
Nevada	0	0	0	------	------	------	1	11	0	1	0	0
PACIFIC												
Washington	7	5	1	2	------	------	43	383	248	1	2	0
Oregon	3	9	1	25	16	23	50	221	34	8	10	2
California	22	23	26	69	55	55	105	66	134	26	6	1
Total	317	331	569	23,746	2,604	2,742	8,161	4,285	4,063	287	103	34
49 weeks	12,960	14,643	15,659	126,643	101,023	169,793	580,588	491,288	491,288	16,817	3,887	1,915

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 11, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis: Week ended— Dec. 11, 1943	Poliomyelitis: Week ended— Dec. 12, 1942	Poliomyelitis: Median 1938–42	Scarlet fever: Week ended— Dec. 11, 1943	Scarlet fever: Week ended— Dec. 12, 1942	Scarlet fever: Median 1938–42	Smallpox: Week ended— Dec. 11, 1943	Smallpox: Week ended— Dec. 12, 1942	Smallpox: Median 1938–42	Typhoid and paratyphoid fever [3]: Week ended— Dec. 11, 1943	Typhoid and paratyphoid fever [3]: Week ended— Dec. 12, 1942	Typhoid and paratyphoid fever [3]: Median 1938–42
NEW ENGLAND												
Maine	0	1	1	21	25	18	0	0	0	0	1	2
New Hampshire	0	0	0	6	9	3	0	0	0	0	1	0
Vermont	0	0	0	7	5	5	0	0	0	0	0	0
Massachusetts	4	0	0	244	293	140	0	0	0	2	2	2
Rhode Island	0	0	0	6	6	7	0	0	0	0	0	0
Connecticut	0	0	0	47	37	39	0	0	0	1	0	1
MIDDLE ATLANTIC												
New York	14	3	3	353	278	273	0	0	0	5	6	6
New Jersey	0	0	2	99	59	95	0	0	0	1	2	2
Pennsylvania	0	5	2	213	225	234	0	0	0	6	0	5
EAST NORTH CENTRAL												
Ohio	1	2	2	278	330	330	0	0	0	0	5	6
Indiana	0	1	1	57	55	114	0	6	6	1	0	1
Illinois	4	0	1	202	161	294	1	1	1	1	2	7
Michigan [2]	4	3	2	154	111	154	0	0	1	1	1	1
Wisconsin	1	1	1	148	178	146	0	1	2	0	1	1
WEST NORTH CENTRAL												
Minnesota	0	0	2	110	88	89	0	0	16	0	2	0
Iowa	0	2	2	67	68	62	1	0	4	0	0	0
Missouri	1	0	0	64	66	66	0	0	3	1	8	2
North Dakota	1	0	1	17	5	21	0	0	0	0	0	0
South Dakota	0	0	0	33	33	33	0	0	0	1	0	0
Nebraska	0	0	0	31	18	20	1	2	0	0	0	0
Kansas	3	3	1	93	67	88	4	0	0	0	0	1
SOUTH ATLANTIC												
Delaware	0	0	0	7	5	12	0	0	0	0	1	1
Maryland [3]	0	1	1	88	54	51	0	0	0	2	2	4
District of Columbia	0	0	0	23	14	14	0	0	0	0	0	0
Virginia	1	0	1	40	45	52	0	0	0	2	0	4
West Virginia	1	0	0	50	47	49	0	0	0	2	1	5
North Carolina	1	0	1	107	81	99	0	0	0	1	2	2
South Carolina	0	1	1	8	21	20	1	0	0	3	0	3
Georgia	1	0	1	15	34	34	0	0	0	0	4	4
Florida	1	0	0	23	7	7	0	0	0	1	0	2
EAST SOUTH CENTRAL												
Kentucky	2	0	2	75	39	89	0	0	0	1	2	3
Tennessee	0	1	1	78	74	58	0	0	0	1	8	7
Alabama	0	0	1	20	19	35	0	0	0	1	0	0
Mississippi [3]	0	0	1	9	20	20	0	1	0	3	0	1
WEST SOUTH CENTRAL												
Arkansas	1	3	1	6	6	13	0	0	1	0	3	3
Louisiana	1	0	1	7	8	14	0	0	0	0	3	5
Oklahoma	5	0	1	26	26	24	0	0	1	5	1	2
Texas	10	22	2	63	39	56	1	1	1	10	10	10
MOUNTAIN												
Montana	1	0	0	32	10	16	1	0	1	0	0	0
Idaho	0	0	0	52	1	10	0	1	0	0	0	0
Wyoming	1	0	0	3	3	7	0	0	0	0	0	0
Colorado	4	2	1	36	47	45	0	0	0	0	2	0
New Mexico	1	0	0	1	9	17	0	0	0	4	2	3
Arizona	0	1	0	18	2	4	2	0	0	0	3	0
Utah [2]	2	1	1	88	53	22	0	0	0	1	0	0
Nevada	0	0	0	2	0	0	0	0	0	1	0	0
PACIFIC												
Washington	7	0	1	152	28	29	0	0	0	0	0	1
Oregon	9	0	1	99	19	20	0	0	2	0	0	1
California	14	13	5	179	144	144	0	0	1	26	4	5
Total	96	66	91	3,557	2,967	3,091	12	13	50	84	79	140
49 weeks	12,230	4,047	7,125	131,727	118,838	146,519	713	750	2,292	5,306	6,531	9,286

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 11, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough: Week ended— Dec. 11, 1943	Whooping cough: Week ended— Dec. 12, 1942	Whooping cough: Median 1938–42	Week ended Dec. 11, 1943: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENGLAND												
Maine	10	124	66	0	0	0	0	0	0	0	0	0
New Hampshire	0	8	7	0	0	0	0	0	0	0	0	0
Vermont	30	51	51	0	0	0	0	0	0	0	0	0
Massachusetts	91	305	218	0	0	0	3	1	0	0	0	0
Rhode Island	24	48	36	0	0	0	0	0	0	0	0	0
Connecticut	22	84	84	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	345	450	494	1	2	12	0	3	0	0	0	0
New Jersey	62	212	212	0	0	0	0	0	0	0	0	0
Pennsylvania	96	347	347	0	2	0	0	2	0	0	1	0
EAST NORTH CENTRAL												
Ohio	127	152	152	0	0	0	0	0	0	0	0	0
Indiana	20	16	17	0	0	0	0	0	0	0	1	0
Illinois	101	176	176	0	0	1	0	2	0	0	4	0
Michigan [2]	204	321	321	0	7	6	0	2	0	0	0	0
Wisconsin	135	216	216	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	45	42	52	0	6	0	0	0	0	0	0	0
Iowa	23	33	27	0	0	0	0	0	0	0	0	0
Missouri	19	8	14	0	0	0	0	0	0	0	0	0
North Dakota	20	20	13	0	0	0	0	0	0	0	0	0
South Dakota	0	2	2	0	0	0	0	0	0	0	0	0
Nebraska	7	1	7	0	0	0	0	0	0	0	0	0
Kansas	37	27	27	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC												
Delaware	0	6	13	0	0	0	0	0	0	0	0	0
Maryland [2]	37	126	55	0	0	0	2	0	0	0	5	0
District of Columbia	6	17	17	0	0	0	0	0	0	0	0	0
Virginia	104	29	40	0	1	0	39	0	0	0	1	0
West Virginia	67	23	23	0	0	0	0	0	0	0	0	0
North Carolina	208	33	142	0	0	0	0	0	0	0	0	[4] 9
South Carolina	48	32	32	0	0	2	0	0	0	0	0	7
Georgia	25	9	14	0	2	0	0	0	0	0	0	34
Florida	31	3	9	0	0	1	0	1	0	0	0	2
EAST SOUTH CENTRAL												
Kentucky	86	15	45	0	0	1	0	0	0	0	1	0
Tennessee	229	42	42	0	0	0	4	0	0	0	0	0
Alabama	2	5	21	0	0	0	0	0	0	0	0	10
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	3
WEST SOUTH CENTRAL												
Arkansas	0	20	19	0	0	2	0	0	0	0	1	1
Louisiana	2	4	9	0	0	10	0	0	0	0	1	4
Oklahoma	4	11	11	0	0	0	0	0	0	0	0	0
Texas	138	161	119	0	55	685	0	2	0	0	0	47
MOUNTAIN												
Montana	6	33	33	0	0	0	0	0	0	0	0	0
Idaho	3	0	0	0	0	0	0	0	0	0	0	0
Wyoming	2	2	4	0	0	0	0	0	0	0	1	0
Colorado	31	14	21	0	1	0	0	0	0	0	0	0
New Mexico	0	16	31	0	1	0	0	0	0	0	0	0
Arizona	14	32	11	0	0	0	59	0	0	0	0	0
Utah [2]	26	17	24	0	0	0	0	0	0	0	0	0
Nevada	0	4	4	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	61	22	26	0	0	0	0	0	0	0	0	0
Oregon	26	5	23	0	0	0	0	0	0	0	0	0
California	101	248	192	0	2	1	0	0	1	0	1	0
Total	2,675	3,572	4,126	1	79	722	107	13	1	0	18	117
49 weeks	171,855	169,469	169,469	63	2,050	17,099	4,230	660	29	435	746	[4] 4,304
49 weeks, 1942	------	------	------	76	1,133	11,763	6,299	542	44	451	831	3,509

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever cases reported separately as follows: Massachusetts, 1; Florida, 1; South Carolina, 2; Texas, 4.
[4] Later information shows 6 cases of typhus fever for North Carolina for the week ended Nov. 20, 1943, instead of 7 as previously reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended November 27, 1943

This table lists the reports from 85 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	1	0	------	0	3	0	2	0	4	0	0	1
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	2	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	2	0	------	1	4	0	7	0	37	0	0	28
Fall River	0	0	------	0	0	1	1	1	4	0	0	7
Springfield	0	0	------	0	4	1	0	0	8	0	0	0
Worcester	0	0	------	0	1	0	6	0	23	0	0	8
Rhode Island:												
Providence	0	0	------	0	61	1	2	0	3	0	0	24
Connecticut:												
Bridgeport	1	0	------	0	0	2	0	0	9	0	0	4
Hartford	0	0	------	0	1	0	3	1	7	0	0	3
New Haven	0	0	------	0	1	0	0	0	1	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	1	1	0	5	0	4	0	0	6
New York	13	1	3	1	199	18	44	3	115	0	4	52
Rochester	0	0	------	0	1	1	8	0	3	0	0	13
Syracuse	0	0	------	0	0	0	0	0	0	0	0	23
New Jersey:												
Camden	0	0	------	0	0	0	0	0	5	0	0	0
Newark	0	0	2	0	3	4	4	0	9	0	0	9
Trenton	0	0	1	0	0	1	1	0	1	0	0	1
Pennsylvania:												
Philadelphia	6	0	1	0	1	4	22	0	36	0	0	12
Pittsburgh	0	0	1	2	86	3	14	0	21	0	4	8
Reading	1	0	------	0	1	0	1	0	2	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	7	0	------	1	10	1	4	0	24	0	0	6
Cleveland	0	0	4	0	11	4	11	0	52	0	0	21
Columbus	0	0	------	0	16	0	2	0	4	0	0	26
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	0	0	0	0
Indianapolis	2	0	------	1	2	0	2	0	14	0	0	10
South Bend	0	0	------	0	29	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	0	0	5	0	0	0	0	0
Illinois:												
Chicago	1	0	3	0	4	5	28	5	50	0	0	43
Springfield	0	0	------	0	1	0	0	0	4	0	0	0
Michigan:												
Detroit	5	0	------	2	7	16	19	1	36	0	0	30
Flint	0	0	------	0	0	0	4	0	0	0	0	0
Grand Rapids	0	0	------	0	10	1	1	0	7	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	5	0	0	0
Milwaukee	0	0	2	2	2	0	8	0	38	0	0	49
Racine	0	0	1	1	1	0	0	0	6	0	0	2
Superior	0	0	------	0	96	0	0	0	0	0	0	3
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	8	0	1	0	18	0	0	20
Minneapolis	13	0	------	0	27	5	2	0	16	0	0	2

City reports for week ended November 27, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENTRAL—con.												
Missouri:												
Kansas City	2	0	------	0	0	3	3	0	24	0	0	3
St. Joseph	0	0	------	0	0	0	0	0	4	0	0	0
St. Louis	0	0	148	2	3	3	15	1	6	0	0	8
Nebraska:												
Omaha	3	0	------	0	3	0	1	0	8	0	0	0
Kansas:												
Topeka	0	0	------	0	1	0	2	0	1	0	0	9
Wichita	1	0	1	0	0	0	4	0	3	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	4	1	2	0	0	0	0	0
Maryland:												
Baltimore	8	0	3	0	9	3	9	0	24	0	0	47
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	6	0	4	0	4	0	5	0	21	0	1	3
Virginia:												
Lynchburg	0	0	------	0	260	0	4	0	0	0	0	12
Richmond	1	0	------	0	6	1	4	0	7	0	1	1
Roanoke	0	0	------	0	0	0	0	0	2	0	0	1
West Virginia:												
Charleston	0	0	------	0	9	0	0	0	1	0	0	0
Wheeling	0	0	------	0	0	1	0	0	0	0	0	6
North Carolina:												
Winston-Salem	1	0	11	0	0	0	0	0	1	0	0	0
South Carolina:												
Charleston	0	0	12	0	3	0	1	0	1	0	0	0
Georgia:												
Atlanta	5	0	11	0	0	0	5	0	4	0	0	0
Brunswick	0	0	------	0	7	1	1	0	0	0	0	0
Savannah	1	0	1	0	0	0	4	0	3	0	0	0
Florida:												
Tampa	0	0	------	0	0	1	2	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	1	0	31	2	0	0	2	0	4	0	0	2
Nashville	1	0	------	5	0	0	2	0	3	0	0	2
Alabama:												
Birmingham	0	0	------	1	3	0	5	0	1	0	0	0
Mobile	1	0	1	2	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	0	0	0	0
Louisiana:												
New Orleans	7	0	1	0	2	2	10	1	6	0	2	5
Shreveport	0	0	------	0	0	0	5	0	0	0	0	0
Texas:												
Dallas	0	0	------	0	0	0	2	0	1	0	0	9
Galveston	0	0	------	0	0	0	1	0	0	0	0	0
Houston	1	0	------	0	1	0	3	1	5	0	1	0
San Antonio	1	0	------	0	1	0	3	2	0	0	0	6
MOUNTAIN												
Montana:												
Billings	0	0	------	0	2	0	1	0	1	0	0	0
Great Falls	0	0	------	0	37	0	0	0	2	0	0	2
Helena	0	0	------	0	0	0	0	0	1	0	0	0
Missoula	0	0	------	0	0	0	0	0	4	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	1	0	0	1

City reports for week ended November 27, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
MOUNTAIN—continued												
Colorado:												
Denver	1	0	5	1	7	0	5	0	12	0	0	20
Pueblo	0	0	------	0	64	0	1	0	0	0	0	4
Utah:												
Salt Lake City	0	0	------	0	0	0	0	4	10	0	0	1
PACIFIC												
Washington:												
Seattle	0	0	------	0	3	0	6	0	7	0	0	2
Spokane	0	0	1	1	6	0	4	0	14	0	0	2
California:												
Los Angeles	11	0	4	1	17	5	6	4	25	0	0	5
Sacramento	0	0	------	0	0	0	2	0	3	0	0	0
San Francisco	1	0	1	0	1	3	11	2	17	0	0	8
Total	105	1	253	27	1,044	92	341	26	790	0	13	566
Corresponding week, 1942	85	1	134	27	653	36	407	24	754	2	17	951
Average, 1938-42	111	------	232	[1] 28	[2] 777	------	[1] 363	------	784	4	24	1,160

[1] 3-year average, 1940-42.
[2] 5-year median.

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: New York, 1; St. Louis, 1.
Dysentery, bacillary.—Cases: Bridgeport, 1; New York, 7; Detroit, 1; Charleston, S. C., 2; Los Angeles, 8.
Dysentery, unspecified.—Cases: Richmond, 1; San Antonio, 8.
Tularemia.—Cases: Philadelphia, 1.
Typhus fever.—Cases: Charleston, S. C., 1; Savannah, 2; Nashville, 1; Birmingham, 1; Mobile, 2; New Orleans, 4; Dallas, 2; Houston, 1; Los Angeles, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 85 cities in the preceding table (estimated population, 1942, 34,253,600)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	9.9	0.0	0.0	2.5	186.3	12.4	54.7	5.0	243.5	0.0	0.0	189
Middle Atlantic	8.9	0.4	3.6	1.8	130.2	13.8	44.2	1.3	87.4	0.0	3.6	56
East North Central	8.8	0.0	5.8	4.1	110.4	15.8	49.6	3.5	140.1	0.0	0.0	111
West North Central	42.1	0.0	330.3	4.4	93.1	24.4	62.1	2.2	166.2	0.0	0.0	93
South Atlantic	38.2	0.0	72.9	0.0	524.1	13.9	64.2	0.0	111.1	0.0	3.5	121
East South Central	17.8	0.0	190.1	59.4	17.8	0.0	53.5	0.0	47.5	0.0	0.0	24
West South Central	26.4	0.0	2.9	0.0	11.7	5.9	73.3	11.7	35.2	0.0	8.8	41
Mountain	8.0	0.0	40.2	8.0	884.3	0.0	56.3	32.2	249.2	0.0	0.0	225
Pacific	21.8	0.0	10.9	3.6	49.0	14.5	52.6	10.9	119.8	0.0	0.0	31
Total	16.0	0.2	38.5	4.1	158.9	14.0	51.9	4.0	120.3	0.0	2.0	86

PLAGUE INFECTION IN KERN COUNTY, CALIF.

Plague infection has been reported proved in a pool of 400 fleas from 22 ground squirrels, *C. beecheyi*, collected November 8, 1943, from a ranch 2 miles northwest of Lebec, Kern County, Calif.

FOREIGN REPORTS

ANGOLA

Notifiable diseases—July–September 1943.—During the months of July, August, and September 1943, certain notifiable diseases were reported in Angola as follows:

Disease	July		August		September	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Beriberi	27	1	12	2	13	3
Cerebrospinal meningitis	2	1	5	1	1	
Chickenpox			60		127	
Diphtheria			1		4	1
Dysentery (amebic)	140	2	140	8	192	9
Dysentery (bacillary)	2		7			
Gonorrhea	216		196		296	
Grippe, infectious	1,082	25	1,127	15	1,128	19
Hookworm disease	342	4	400	6	448	7
Leprosy	2		9		7	
Measles	626	2	84	1	115	2
Mumps	22		24		19	
Pneumonia	220	33	242	28	252	30
Poliomyelitis	5		1		1	
Rabies			1	1		
Relapsing fever	27		21		20	
Sleeping sickness	246	9	231	28	161	21
Smallpox	24		4		15	
Syphilis	405		446	3	419	1
Tetanus	4	2	6		4	4
Tuberculosis (respiratory)	47	6	32	6	53	7
Typhoid and paratyphoid fever	21		12	1	11	
Whooping cough	223	10	259	4	230	6
Yaws	807		846		1,046	1

CANADA

Provinces—Communicable diseases—Week ended November 13, 1943.—During the week ended November 13, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		20		206	441	70	91	57	102	987
Diphtheria	1	13	5	45	3	15	1		2	85
Dysentery (amebic)					1					1
Dysentery (bacillary)				8						8
German measles				1	9		2	3	3	18
Influenza		15	15		22				11	63
Measles		3		150	150	29	1	13	11	357
Meningitis, meningococcus				2	1				1	4
Mumps		27		19	116	46		21	51	280
Poliomyelitis	1		1	1			3	2		8
Scarlet fever		24	4	90	100	27	22	13	66	346
Tuberculosis (all forms)		11	3	92	67	11	62	42	19	307
Typhoid and paratyphoid fever				13					10	23
Undulant fever					1				1	2
Whooping cough		8		92	169	13	14	11	16	323

CUBA

Habana—Communicable diseases—4 weeks ended November 13, 1943.—During the 4 weeks ended November 13, 1943, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	33		Tuberculosis	9	3
Malaria	7	1	Typhoid fever	15	2
Measles	8				

Provinces—Notifiable diseases—4 weeks ended November 6, 1943.—During the 4 weeks ended November 6, 1943, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	3	1	3	5		12	24
Chickenpox						12	12
Diphtheria		33	8	1		4	46
Hookworm disease		15					15
Leprosy			1	1		3	5
Malaria	58	10	13	14	6	435	536
Measles		19	3			2	24
Tuberculosis	13	17	12	21		41	104
Typhoid fever	15	26	15	20	3	37	116

[1] Includes the city of Habana.

FINLAND

Notifiable diseases—September 1943.—During the month of September 1943, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	21	Paratyphoid fever	188
Chickenpox	163	Pneumonia (all forms)	651
Conjunctivitis	9	Poliomyelitis	43
Diphtheria	1,439	Puerperal fever	38
Dysentery	15	Rheumatic fever	227
Gastroenteritis	3,644	Scabies	2,293
Gonorrhea	370	Scarlet fever	588
Hepatitis, epidemic	860	Syphilis	298
Influenza	523	Typhoid fever	45
Laryngitis	36	Vincent's angina	18
Malaria	1	Weil's disease	1
Measles	1,240	Whooping cough	525
Mumps	81		

JAMAICA

Notifiable diseases—4 weeks ended November 20, 1943.—During the 4 weeks ended November 20, 1943, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy		8
Chickenpox	1	8	Puerperal fever		1
Diphtheria	4	4	Tuberculosis	19	63
Dysentery	4	2	Typhoid fever	7	65
Erysipelas	1	1	Typhus fever	3	

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER, RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Belgian Congo.—Plague has been reported in Belgian Congo as follows: October 25–November 1, 1943, Costermansville Province, 2 fatal cases; Stanleyville Province, 9 cases and 8 deaths.

Egypt—Suez.—During the week ended November 20, 1943, 12 cases of bubonic plague with 4 deaths were reported in Suez, Egypt.

Smallpox

Algeria.—For the period October 11–20, 1943, 51 cases of smallpox were reported in Algeria.

Indochina.—Smallpox has been reported in Indochina as follows: October 21–31, 1943, 76 cases; November 1–10, 1943, 56 cases.

Typhus Fever

Algeria.—For the period October 11–20, 1943, 23 cases of typhus fever were reported in Algeria.

Bulgaria.—For the period October 1–November 10, 1943, 33 cases of typhus fever were reported in Bulgaria.

France—Hautes Pyrenees.—During the month of September 1943, 1 case of typhus fever was reported in Hautes Pyrenees, France.

Hungary.—For the period November 14–20, 1943, 7 cases of typhus fever were reported in Hungary.

Irish Free State—Cork County.—During the week ended November 13, 1943, 1 case of typhus fever was reported in Cork County, Irish Free State.

Rumania.—For the period November 16–23, 1943, 81 cases of typhus fever were reported in Rumania.

Slovakia.—For the week ended November 13, 1943, 31 cases of typhus fever were reported in Slovakia.

Yellow Fever

Colombia.—During the month of October 1943, yellow fever was reported in Colombia as follows: Boyaca Department, 4 deaths; Santander Department, 1 death.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF PUBLIC HEALTH METHODS

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THE PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

Public Health Reports

VOLUME 58 DECEMBER 24, 1943 NUMBER 52

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Public Health Reports

Vol. 58 • DECEMBER 24, 1943 • *No. 52*

THE USE OF CURTAIN WALLS IN RATPROOFING

By RALPH PORGES, *Passed Assistant Sanitary Engineer, United States Public Health Service*

Curtain walls may be defined as exterior walls that serve to enclose rather than support. This definition when used in ratproofing applies directly to walls placed in the ground along the periphery of buildings to prevent rats from burrowing into the structure. Curtain walls may be employed to protect buildings from the ingress of rats in the absence of foundation walls, in cases of foundation walls of insufficient depth, and in structures built on pillars not high enough to prevent rats from gaining entrance. Also, such walls may be used to eliminate rat harborage. In the rat stoppage or ratproofing of old buildings, there are instances where curtain walls are a prerequisite to the successful eradication of rodents from within the building. Construction may be of metal or of concrete or masonry, although concrete appears to be most satisfactory because of permanency, ease of construction, and use of nonessential material.

There has been a paucity of experimental and practical evidence upon which to base specifications for an effective rat barrier in the form of a curtain wall. Since the economic factor in rat stoppage is also of importance, the depth to which a wall must extend is significant. Thus there arises the question as to what constitutes an effective economical curtain wall for routine rat stoppage procedure.

Although the value of repairing foundation walls has been known for some time, scant attention has been devoted to the depth and type necessary to restrain rats. During the plague outbreak at San Francisco in 1907-08 (*1*), basement walls were repaired. An ordinance was passed that required buildings to be constructed in such a manner as to prevent harborage of rats underneath or within the walls. In 1912 experimental tests (*2*) were made by the United States Public Health Service in San Juan, P. R., to ascertain the depth to which rodents would burrow. Rats were allowed free movement within

an enclosure for 2 months, food and water being supplied. Careful excavation showed the maximum depth of burrows to be approximately 22 inches. It is possible that hungry rats under natural conditions might have burrowed deeper. During the later plague outbreaks (1920–24), several ratproofing ordinances were enacted. Pensacola (*3*) required foundation walls to extend 18 inches below ground surface; Los Angeles (*4*) likewise had the same requirement with the exception, however, of that part of the wall sealed to concrete sidewalks facing streets. This is not always satisfactory since many instances have occurred where rats have entered buildings by burrowing beneath the street and sidewalks necessitating excavation through concrete walks to place curtain walls. An English reference (*5*) states that for the protection of stacks in rural areas galvanized iron sheets may be sunk into the ground to a depth of 2½ feet. Holsendorf (*6*), in 1937, stated that walls of approved ratproof material should extend at least 3 feet below ground surface. Boston (*7*), in applying "vent stoppage" to typhus control, employed curtain walls of masonry or metal extending 24 inches into the ground. Tucker, Woodring, and Essick (*8*), during an outbreak of typhus fever in Nashville, likewise used the 2-foot depth. Silver and Garlough (*9*) recommend that retaining walls extend 2 feet underground to prevent rats from burrowing under the floor from the outside. Silver, Crouch, and Betts (*10*) state that rats seldom burrow deeper than 2 feet unless natural passageway exists and include an illustration depicting a curtain wall with a footing; no dimensions are given.

There is little agreement as to what is an effective wall although there has been a tendency toward increasing the depth.

Among the various projects with which the Typhus Control Unit of the United States Public Health Service has cooperated, the typhus control program at Charleston, S. C., has offered the best opportunity to study curtain walls and their effectiveness as rat deterrents. Charleston has proved to be a true testing ground because of the large number of buildings requiring curtain walls. To date, over 4,000 feet of concrete curtain walls have been constructed. A summary of the curtain walls installed is presented in table 1.

TABLE 1.—*Summary of results*

Number of establishments	Curtain walls		Number of walls under which rats burrowed [1]	Number of walls repaired by L-construction	Number of food-handling establishments
	Type	Length			
2	24 inches	89 feet	2	2	2
27	36 inches	1,358 feet	12	9	20
1	48 inches	71 feet	1	1	1
15	24x12-inches L	759 feet	0		10
31	18x12-inches L	1,793 feet	1		3
1	12x12-inches L	44 feet	0		1

[1] All places entered by rats burrowing under walls were food-handling establishments.

The first walls placed in Charleston consisted of two 24-inch straight walls totaling 89 feet. These walls were constructed by excavating a trench and pouring a concrete slab approximately 4 inches thick to the desired depth and sealing the wall at the top to the structure being ratproofed. Rats penetrated both establishments by burrowing under the walls. One wall was then extended to 36 inches while in the interim twenty-six 36-inch walls totaling over 1,300 feet were installed. The extended wall was underpassed by rats, as were eleven of the other 36-inch walls. The original wall was again extended, this time to 48 inches. Rats burrowed under this 48-inch curtain wall. In an attempt to block out the rats, Sanitary Inspector J. H. Harris, of the United States Public Health Service, placed a 12-inch horizontal flange at the base of this wall with complete success. The flange was further applied to 10 cases where the straight walls already placed were underpassed. The flanges stopped the rats from undermining in all instances.

A concrete L-shaped wall was developed consisting of a vertical portion approximately 4 inches thick having a horizontal flange at the bottom 2 inches thick extending 8 inches out from the vertical or 12 inches over-all horizontal measurement. The depth was varied to ascertain the minimum or most economical depth for an effective wall. Such walls are customarily constructed by excavating a trench 1 foot wide down to the required depth. A 2-inch layer of concrete is placed on the bottom of the trench and then the vertical portion is poured approximately 4 inches thick to any desired height and tied in with the building. An economical form has been devised utilizing waste cardboard, usually from old cartons, spaced by 2×4-inch lumber. If the earth is firm, it may be used as one side of the form. As the concrete is poured, earth is shoveled back, keeping the form straight. The lumber is removed, as the pouring of concrete progresses, to be reused while the cardboard is left in the ground.

Fifteen establishments have been protected by 759 feet of 24-inch L-shaped curtain walls with no infiltration underneath by rats. In 31 places, 1,793 feet of 18-inch L wall were used; rats burrowed under in one instance. One establishment was tried with 44 feet of 12-inch L with no penetration.

All establishments entered by rats burrowing under curtain walls were food places. The number of food establishments treated with each type of wall is given in table 1. Rats penetrated 60 percent of the food units protected by the 36-inch straight wall, or 12 out of 20 instances. Although the 18-inch L wall proved effective with 28 nonfood buildings, one out of three food units was entered. The 24-inch L wall protected all units including 10 food establishments.

DISCUSSION

The rat-stoppage work at Charleston clearly demonstrates the ineffectiveness of straight curtain walls placed to a depth of 48 inches. Experiences on other projects have also indicated that rats occasionally may overcome the 48-inch barrier.

The 24-inch L-shaped curtain walls presented a different picture. Complete protection was provided without excessive cost, although many burrows were traced down to the shelf and in many cases along the entire flange. One 18-inch L wall out of thirty-one was evaded although a 12-inch L wall ratproofing a grocery store appeared satisfactory.

The type of establishment and resultant infestation naturally play an important part in ratproofing. A food establishment heavily infested offers a difficult problem. Likewise in a rat-infested area the rodents' effort to regain their source of food presents a biological pressure against ratproofing measures. Charleston provided a severe test for ratproofing. Of 77 establishments with curtain walls, 38 were food units. All establishments burrowed into by rats were food-handling places. It would appear that rats, having their normal by-ways blocked and being attracted by the food, make an extra effort to enter these buildings.

In a great many instances rats have been stopped within buildings and burrow under the wall to effect an exit. Once a burrow is made, it serves as a mode of egress and ingress. In two cases with 36-inch straight walls, such burrows were observed and closed by tamping the earth. No rats have reentered the building. The one 18-inch L wall which was burrowed was believed to have been caused by a rat trying to escape from the building. It is believed that it is practically impossible to keep a rat from getting out of a building if it so desires. By promptly eradicating all rats locked within a building, ratproofing will prove more effective. Also, once a rat burrows out, it will make a strong effort to return especially if its food supply has been restricted.

The L-shaped walls find application in new construction and in the repair of old buildings. Where concrete floors are present, the value of curtain walls is questionable. However, in the absence of rat-proof floors, rat penetration should be anticipated and the 24-inch L wall should prove more effective and economical than straight walls. While ratproofing old buildings, many foundations are encountered extending 18 to 24 inches below ground surface that may be protected by merely installing a flange at the base.

CONCLUSIONS AND SUMMARY

Curtain walls are used in ratproofing to enclose areas to prevent the ingress of rats. Actual results have been discussed in order to

illustrate the value of various types of walls and to present an effective modification for routine procedure.

The typhus control program at Charleston, S. C., offered an excellent opportunity to study curtain walls since 77 establishments have been protected by over 4,000 feet of such walls. The effectiveness was judged by the rapidity of rat eradication from within the building and by the absence of rat burrows under the walls.

Rats burrowed under 24-inch, 36-inch, and 48-inch straight walls protecting food establishments. A concrete L-shaped wall was developed consisting of a vertical portion 4 inches thick and a horizontal flange at the bottom 2 inches thick extending 8 inches out from the vertical or 12 inches over-all horizontal measurement. Fifteen 24-inch L walls, thirty-one 18-inch L walls, and one 12-inch L wall have been placed. Rats burrowed under one 18-inch L wall.

For routine rat-stoppage procedure, it is suggested that the 24-inch L-shaped curtain wall be utilized.

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SICKNESS ABSENTEEISM AMONG INDUSTRIAL WORKERS, SECOND QUARTER OF 1943, WITH A NOTE ON THE OCCURRENCE OF THE RESPIRATORY DISEASES, 1934–43 [1]

By W. M. Gafafer, *Principal Statistician, United States Public Health Service*

The accompanying data are derived from analyses of periodic reports on sickness and nonindustrial injuries causing disability lasting more than 1 week among over 250,000 male members of industrial sick benefit associations, group insurance plans, and company relief departments.

[1] From the Division of Industrial Hygiene, National Institute of Health. The first quarter appeared in Pub. Health Rep., 58: 1273–1277 (Aug. 20, 1943).

The rate of 114.6 for sickness shows an increase of 31 percent when compared with the corresponding rate (87.4) for 1942, the chief contributing factor to the increase being the group of respiratory diseases with its increase of 68 percent from a rate of 33.4 in 1942 to a rate of 56.0 in 1943. It will be observed that each member of the respiratory group of diseases shows an increase, notable increases being shown by pneumonia, 88 percent; influenza and grippe, 77 percent; and bronchitis, 75 percent.

TABLE 1.—*Average annual number of absences on account of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer among* MALE *employees in various industries, by cause, the second quarter of 1943 compared with the second quarter of 1942, and the first half of 1943 compared with the first halves of the years 1938–42, inclusive* [1]

Cause (numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of absences per 1,000 males				
	Second quarter		First half		
	1943	1942	1943	1942	1938–42
Sickness and nonindustrial injuries [2]	125.6	98.1	145.1	110.5	107.3
Nonindustrial injuries (169–195)	11.0	10.7	11.9	11.4	10.9
Sickness	114.6	87.4	133.2	99.1	96.4
Respiratory diseases	56.0	33.4	76.6	45.3	46.8
Tuberculosis of the respiratory system (13)	1.0	.8	.7	.7	.8
Influenza, grippe (33)	20.3	11.5	30.6	17.8	22.6
Bronchitis, acute and chronic (106)	9.1	5.2	12.8	7.2	6.1
Pneumonia, all forms (107–109)	9.2	4.9	12.6	6.1	4.7
Diseases of the pharynx and tonsils (115b, 115c)	6.6	5.5	8.3	5.7	5.9
Other respiratory diseases (104, 105, 110–114)	9.8	5.5	11.6	7.8	6.7
Digestive diseases	16.3	16.1	15.5	16.1	14.8
Diseases of the stomach except cancer (117, 118)	5.6	4.5	5.1	4.4	4.0
Diarrhea and enteritis (120)	1.7	1.5	1.6	1.5	1.2
Appendicitis (121)	4.3	5.3	4.1	5.3	5.0
Hernia (122a)	1.9	2.0	2.0	1.9	1.7
Other digestive diseases (115a, 115d, 116, 122b–129)	2.8	2.8	2.7	3.0	2.9
Nonrespiratory-nondigestive diseases	38.1	35.8	37.2	35.6	32.5
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44) [3]	3.5	3.2	3.1	3.2	2.7
Rheumatism, acute and chronic (58, 59)	4.8	4.2	4.6	4.1	4.3
Neurasthenia and the like (part of 84d)	1.4	1.0	1.3	1.0	1.0
Neuralgia, neuritis, sciatica (87b)	2.6	2.3	2.8	2.3	2.3
Other diseases of the nervous system (80–85, 87, except part of 84d, and 87b)	1.4	1.1	1.4	1.2	1.2
Diseases of the heart and arteries, and nephritis (90–99, 102, 130–132)	5.3	4.4	5.3	4.7	4.6
Other diseases of the genitourinary system (133–138)	2.7	2.7	2.6	2.5	2.4
Diseases of the skin (151–153)	3.1	2.8	2.9	2.6	2.6
Diseases of the organs of movement except diseases of the joints (156b)	3.6	2.9	3.6	3.2	3.0
All other diseases (45–57, 60–79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	9.7	11.2	9.6	10.8	8.4
Ill-defined and unknown causes (200)	4.2	2.1	3.9	2.1	2.3
Average number of males covered in the record	272,519	259,166	269,797	255,528	1,014,495
Number of organizations	21	21	21	21	----------

[1] The same 21 organizations are included in 1943 and 1942.

[2] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not reported.

[3] Except influenza and grippe, respiratory tuberculosis, and the venereal diseases.

The digestive diseases show a slight increase while appendicitis reveals a decrease from 5.3 to 4.3.

The nonrespiratory-nondigestive diseases present an increase of 12 percent, neurasthenia increasing 40 percent and diseases of the heart and arteries, and nephritis over 20

SECOND QUARTERS OF 1934–43

Figure 1 presents graphically in the upper half of the figure the variation over the 10-year period, 1934–43, of the contribution of each broad cause group to the varying total sickness rate, the lower half showing the contribution made by influenza and grippe, bronchitis, and pneumonia, respectively, to the varying total respiratory disease rate.

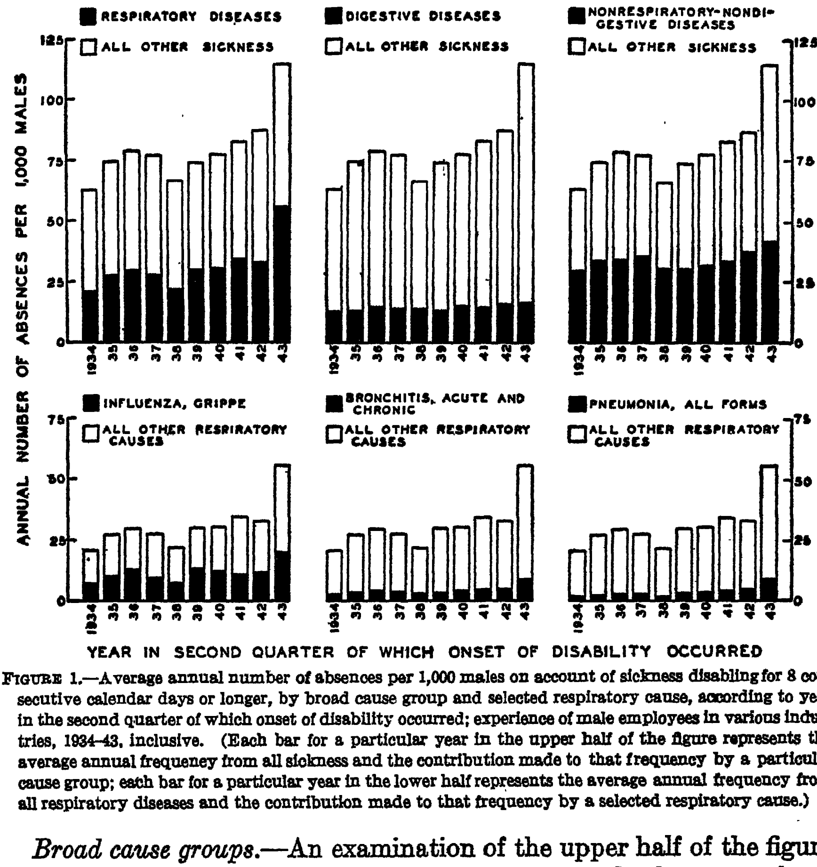

FIGURE 1.—Average annual number of absences per 1,000 males on account of sickness disabling for 8 consecutive calendar days or longer, by broad cause group and selected respiratory cause, according to year in the second quarter of which onset of disability occurred; experience of male employees in various industries, 1934–43, inclusive. (Each bar for a particular year in the upper half of the figure represents the average annual frequency from all sickness and the contribution made to that frequency by a particular cause group; each bar for a particular year in the lower half represents the average annual frequency from all respiratory diseases and the contribution made to that frequency by a selected respiratory cause.)

Broad cause groups.—An examination of the upper half of the figure reveals that the sickness rate of 114.6 per 1,000 males has never been equalled or exceeded during the 10-year period, the rate being 44 percent in excess of the mean (79.6) for the 10 second quarters. The increases from 1938 to 1942 have been relatively gradual ones while the increase from 1942 to 1943 appears to be abrupt. The respiratory group of diseases generally reflects the changes in the total sickness rate.

The rates for the group of digestive diseases show no spectacular changes. While the rate of 16.3 for 1943 exceeds only slightly the

rate for 1942, it is the highest rate shown by the 10-year period and exceeds the 10-year mean (14.3) by 14 percent.

The group of nonrespiratory-nondigestive diseases shows an upward trend in the period 1934–37 and another in 1938–43. The rate for 1943 (42.3) is the highest for the 10-year period and exceeds the mean (34.0) by 24 percent.

Influenza and grippe, bronchitis, and pneumonia.—The lower half of figure 1 shows a number of noteworthy relationships. Each of the three graphs shows over the 10-year period the variation of the second-quarter rate for the respiratory group of diseases, and the contribution made to this rate by influenza and grippe, bronchitis, and pneumonia, respectively, is indicated.

It will be observed that the influenza and grippe rate (20.3) for 1943 is the highest for the 10-year period, being 78 percent in excess of the 10-year mean of 11.4. The variation of the rate follows rather closely the rate for the respiratory group of diseases. Similarly with regard to bronchitis and pneumonia each presents the highest rate in 1943; when these rates are compared with their 10-year means, excesses of 102 and 149 percent, respectively, are found.

THE BENEFITS ACCRUING FROM THE RATPROOF CONSTRUCTION OF VESSELS

By G. C. Sherrard, *Senior Surgeon (R), United States Public Health Service*

For over a decade the United States Public Health Service has been interested in securing the elimination of potential rat harborage on new American ships during construction. This interest arose from a desire to protect American ports against the introduction of rat-borne diseases and to secure for American shipping interests the benefits accruing from the operation of rat-free vessels.

A review of the sanitary reports concerning ships found to harbor plague-infected rats indicates that in each instance the ship afforded a considerable amount of structural harborage which had been colonized by rats. When it is considered that the danger of introducing plague and other rat-borne disease into a port through the medium of merchant ships is in direct proportion to the number of rat-infested ships entering the port and the extent of such infestation, the value of preventive measures such as ratproofing will be apparent. It is also evident that the danger of conveying plague from infected to non-infected ports is greater when a plague-infected rat gains access to a vessel harboring a large colony of rats than would be the case if the same rat entered a rat-free ship affording no harborage.

In order that the scope of this paper may be clearly understood, the following definition is given: Ratproofing, as it relates to ship

construction, is the application of procedures designed to eliminate or render inaccessible to rats those spaces capable of affording protected harborage where rats may successfully obtain shelter, or may nest, breed, or obtain food. These spaces may occur as the result of structural design, the installation of fixtures and furnishings, or careless workmanship.

BENEFITS DERIVED BY SHIPPING INTERESTS

The benefits which shipping interests derive from operating ratproof ships may be summed up as follows:

(1) Reduction of the expense and delay resulting from fumigation necessitated by rat infestation.

(2) Protection of the vessel's passengers and crew against the hazards of rat-borne diseases.

(3) Elimination of damage to cargo and ship structure from gnawing of rats.

(4) Reduction of fire hazards.

All of these benefits are not subject to appraisal. However, the frequency of fumigations, together with the degree and frequency of rat infestation on shipboard, is a matter of record.

DISCUSSION

The monetary result of ratproofing ships during construction is shown by the fact that at the port of New York not a single vessel constructed and structurally maintained in accordance with the ratproofing specifications [1] of the United States Public Health Service has ever been fumigated for the destruction of rats. Aside from delay, it is estimated that the cost of fumigating an average-sized freight ship ranges between $600 and $1,000 for each fumigation.

The application by the United States Public Health Service of such sanitary measures as ratproofing, sanitary inspection, trapping, protection of food supplies, and allied procedures in cooperation with the shipping interests has resulted in a reduction in the number of ships fumigated at the port of New York from 1,179 in the fiscal year 1925 to 157 during the year 1943.

Using the conservative estimate of $600 for each ship fumigated, these measures have reduced the total annual cost of fumigation to the shipping interests from $707,400 in the year 1925 to $94,200 in 1943.

During the fiscal year ended June 30, 1943, 3,767 vessels underwent sanitary inspection at New York. Of these, 3,004 had not been ratproofed while 763 vessels had been ratproofed according to Public Health Service standards. Of the non-ratproof vessels, 983 were

[1] Ratproofing of New Ships. Supplement No. 151 to the Public Health Reports.

found to be rat infested and 157 were subjected to fumigation. On the other hand, only 15 of the 763 ratproof vessels were rat infested and none was fumigated. The value of ship ratproofing is clearly evidenced by these figures.

The value of ratproofing measures is not fully indicated in the statistics presented for the reason that a considerable number of rat-infested foreign vessels which are non-ratproof and have not recently called at plague-infected or suspected ports are permitted to return to their home ports for fumigation. Again many rat-infested foreign vessels are fumigated immediately prior to sailing for the port of New York. The total fumigations of non-ratproof ships would show an approximate threefold increase if these fumigations were considered.

It will be noted that of all the ships found to be rat infested, only one in six was fumigated. This is accounted for by the fact that only those ships found to be rat infested to the extent of presenting a definite health hazard are fumigated. The control of rats on ships not coming within this category is accomplished by intensive trapping,[2] elimination of waste foods, and general sanitary measures. The few rats which occasionally come aboard ratproofed ships are easily eliminated by means of traps or by direct violence, there being no place for them to hide after discharge of cargo.

While an endeavor has been made to illustrate the value of eliminating potential rat harborages on ships during the course of construction, it is desired to emphasize the importance of all phases of sanitary construction. Ratproofing is complementary to and a part of general sanitation. Any procedure which tends to control rat infestation will also raise the sanitary standard and vice versa. This fact is recognized by the Public Health Service and considerable attention has been devoted to the promotion of construction features which will facilitate the maintenance of cleanliness while the ship is in operation.

SUMMARY

The value of eliminating potential rat harborage on ships during the course of construction is discussed. A comparison is made between ratproofed and non-ratproofed vessels as to rat infestation and fumigation. Only 1.7 percent of the 763 ratproofed ships entering the port of New York during the fiscal year 1943 was rat infested and in no instance was the infestation sufficient to require fumigation.

[2] Trapping Rats on Ships. Reprint No. 2170 from the Public Health Reports.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

November 7–December 4, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended December 4, 1943, the number reported for the corresponding period in 1942, and the median number for the years 1938–42.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—Whether the cases be called influenza, grippe, catarrhal fever, or just common cold, there is little doubt that an epidemic of acute upper respiratory affections of a mild form is sweeping the country. With local estimates of prevalence of as high as 10 percent of the population sick from these affections, and with estimated cases running into the millions, it may seem useless to quote the much smaller numbers of incompletely reported cases. A single case of a mild grippe may not be diagnosed as influenza, but if the attending physician knows that many similar cases exist in the community at that particular time, the case is more likely to be called influenza. In other words, the diagnostic term used may be based on epidemiological as well as clinical evidence. As a consequence, reporting of cases of "influenza" may begin after the prevalence of the epidemic is recognized rather than be the first intimation of the outbreak. In spite of these shortcomings, it may be worth while to look at the numbers of cases reported as influenza by attending physicians.

The number of reported cases of influenza rose from 5,581 during the 4 weeks ended November 6 to 10,238 during the 4 weeks ended December 4. Considered by weeks for a longer period this represents an increase from about 1,200 per week in the first half of October to about 1,400 cases per week in the next 3 weeks (ended November 6), and to 1,555, 1,734, 2,465, 4,484, and 23,746, respectively, in the 5 weeks ended December 11, 1943. However, 12,683, or about half of the cases for the week ended December 11, were reported by 4 States from which few or no cases had previously been reported. Some of these reports may have been estimates rather than actual reports.

The 10,238 cases for the current 4-week period may be compared with 7,147 for this period in 1942, which figure also represents the

median for 1938–42. Considered in weeks, the reported cases up to November 20, 1943, were running about the same as in 1942, about the same or somewhat below 1941, and somewhat above 1940. For the weeks ended November 27 and December 4 the reported cases were considerably above the same week for 1942 and 1941 but below 1940 when a minor epidemic began about this time of the year. In the week ended December 11 there were 23,746 cases as compared with 2,604, 2,742, and 9,663, in the corresponding weeks of 1942, 1941, and 1940, respectively.

The accompanying table shows by geographic area the reported cases of influenza by weeks for the fall of 1943 and corresponding weeks in preceding years. There was a report of 163 cases (half of them in Michigan) in the East North Central States for the week ended November 13, which represented about 5 times the preceding week and about 3 times the same week of 1942; the next 2 weeks dropped back to normal, but the week ended December 4 was up again. In the week ended November 27 (2 weeks after the first East North Central rise) the West North Central, East South Central, West South Central, and the New England States all rose considerably above preceding weeks and also above corresponding weeks of 1942. There is some indication that the West South Central started to rise a week earlier than the other two sections mentioned. The reported cases in the South Atlantic States started to rise in the same week (November 27) but were not above 1942 until the next week. Cases in the Mountain States rose for the first time in the week ended December 4 and the Middle Atlantic and Pacific States showed no rise up to December 4. For the week ended December 11, the reported cases show a definite rise over the preceding week and a definite excess over the same week of 1942 in every section except the Pacific coast. Other evidence supports the generalization that the epidemic started in the Great Lakes region about the second week of November and had reached nearly all sections by the end of the first week in December.

Of more importance than reported cases is the question of mortality. As already noted, the overwhelming proportion of the cases are mild with no serious complications. However, even the mildest outbreaks of respiratory disease are accompanied by some mortality, particularly among the very young and the very old. Figures from the United States Bureau of the Census on mortality from *all causes* in 90 major cities in the United States showed 8,977 and 8,677 deaths for the weeks ended November 20 and 27, respectively. For the next week, ended December 4, there were 9,845 [1] deaths from all causes, or an excess of about 1,000 deaths over the average for the 2 preceding weeks. For the week ended December 11 the rise in deaths from all causes

[1] Figures quoted here include estimates for 1 to 3 cities not reporting for certain weeks.

over the preceding week was about 500 or one-half of the rise of 1,000 mentioned above. However, preliminary reports for the week ended December 18 show a rise of about 1,000 deaths over the number reported for the week ended December 11.

Influenza cases reported by geographic regions by weeks in 1943 and for the corresponding weeks in preceding years

Geographic area and years	Week ended—[1]										
	Oct. 2	Oct. 9	Oct. 16	Oct. 23	Oct. 30	Nov. 6	Nov. 13	Nov. 20	Nov. 27	Dec. 4	Dec. 11
46 States,[2] District of Columbia, and New York City:											
1943	905	1,246	1,288	1,447	1,417	1,429	1,555	1,734	2,465	4,484	23,746
1942	[illegible]	1,098	1,346	1,143	1,339	1,576	1,596	1,769	1,854	1,928	2,604
1941	830	974	995	1,131	1,330	1,553	2,308	2,372	2,469	2,478	2,742
1940	468	599	705	748	856	976	787	1,180	1,332	3,014	9,663
New England:											
1943	3	6	2	7	5	3	1	3	32	54	121
1942	1	3	6	8	11	5	16	4	7	9	3
1941	------	1	6	------	------	1	1	------	2	3	2
1940	3	2	1	1	1	1	6	1	4	5	4
Middle Atlantic:											
1943	7	9	11	11	10	14	7	24	11	36	133
1942	11	26	17	21	15	22	37	20	25	31	31
1941	5	3	16	10	8	9	6	16	11	19	15
1940	9	10	8	5	4	14	6	11	4	6	9
East North Central:											
1943	17	43	32	12	29	32	163	36	41	122	930
1942	62	49	69	34	48	63	50	68	64	50	69
1941	46	60	39	42	61	45	60	105	65	75	79
1940	51	44	53	60	54	57	43	67	56	81	133
West North Central:											
1943	19	7	9	7	9	6	8	17	432	431	7,398
1942	16	24	18	14	10	8	24	15	8	30	42
1941	3	17	11	17	13	13	21	36	15	23	35
1940	4	24	8	9	14	8	10	7	17	19	30
South Atlantic:											
1943	251	301	289	493	402	428	446	507	649	1,227	4,035
1942	315	324	481	450	404	539	637	674	811	559	1,042
1941	264	326	353	317	422	407	434	534	529	624	727
1940	215	195	231	208	280	425	259	500	325	453	632
East South Central:											
1943	45	31	49	62	33	96	70	86	111	428	6,007
1942	40	31	72	51	106	64	52	88	45	90	123
1941	11	5	18	21	29	49	60	97	100	142	101
1940	9	24	21	50	43	22	59	92	76	69	67
West South Central:											
1943	477	714	767	768	773	669	705	815	971	1,546	3,633
1942	423	524	551	452	590	657	626	681	631	907	1,017
1941	356	444	416	580	627	859	1,482	1,350	1,547	1,306	1,474
1940	98	172	247	279	274	327	272	285	210	416	773
Mountain:											
1943	72	106	94	63	97	142	137	224	179	579	1,893
1942	68	96	89	79	109	171	102	156	200	201	206
1941	103	73	101	81	103	110	123	143	146	193	198
1940	45	99	105	108	151	92	108	67	150	390	780
Pacific:											
1943	14	29	35	24	59	39	18	22	39	61	96
1942	23	21	43	39	46	47	52	63	63	51	71
1941	42	45	35	63	67	61	121	91	54	93	111
1940	34	29	31	28	35	30	24	150	490	1,575	7,235

[1] First week of year is the one ended Jan. 4 to 10 inclusive, with corresponding weeks counted from this base.
[2] New York State and Mississippi excluded.

It must be remembered that the deaths mentioned above are from all causes. Also that these 90 cities of 100,000 or more population have an aggregate of some 38,000,000 inhabitants and the numbers of increased deaths quoted above do not mean a large change in the death rate.

Meningococcus meningitis.—Eleven of the States reported more than two-thirds of the total of 967 cases of meningitis for this 4-week period. These 11 States in the order of numbers of cases reported were: New York 121, Pennsylvania 93, California 80, Michigan 69, Massachusetts 46, Ohio 44, Illinois 41, Virginia 35, Maryland 32, Missouri 32, Tennessee 26. These States represent practically all of the geographic regions. There was an increase over the 1938–42 median in every region. For the country as a whole the number of cases was more than 3 times the number reported for the corresponding period in 1942 and more than 7 times the median. In the Pacific region the number of cases (104) was almost 15 times the median, in the East North Central region the number (188) was more than 12 times the median, and in other regions the cases ranged from 2 times the median in the Mountain region to approximately 9 times the median in the North Atlantic and West North Central regions.

An increase in the number of cases of this disease is normally expected at this season of the year and the rate of increase over the preceding 4-week period was about normal. However, meningitis has maintained an unusually high level since December of 1942 and, as has been the case throughout the year, the current incidence is the highest on record for this period. Further increases may be expected as the rise that normally occurs at this time of the year does not reach its peak until March or April.

Poliomyelitis.—The number of cases of poliomyelitis dropped from 1,544 during the preceding 4-week period to 755 during the 4 weeks ended December 4. Compared with preceding years the number of cases was more than twice the number reported during this period in 1942 and 1.3 times the 1938–42 median. In the South Atlantic and East South Central regions the incidence was below normal, but all other regions reported significant excesses over the normal seasonal incidence.

Scarlet fever.—The number of cases of this disease (11,822) was also relatively high during the current 4-week period, being about 10 percent above the 1938–42 median. The greatest increase over the seasonal expectancy was reported from the Pacific Coast, with minor increases in the Mountain, North Atlantic, and West South Central regions. In other regions the numbers of cases either closely approximated the 1938–42 medians or fell considerably below them.

Measles.—The number of reported cases of measles rose from approximately 9,800 during the 4 weeks ended November 6 to 18,239 during the current 4-week period. The incidence was about 8,000 cases above the 5-year median. All sections of the country except the New England, Mountain, and Pacific regions contributed to the relatively high incidence of this disease. However, measles was most prevalent in the two North Central regions; in the East North

Central States the number of cases (6,211) was more than 6 times the 1938–42 median, while in the West North Central region the incidence (3,308 cases) was about 5 times the median. In the Pacific region the incidence was considerably below the seasonal expectancy.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Nov. 7–Dec. 4, 1943, the number for the corresponding period in 1942, and the median number of cases reported for the corresponding period, 1938–42

Division	Current period	1942	5-year median	Current period	1942	5-year median	Current period	1942	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,533	1,854	2,430	10,238	7,147	7,147	18,239	10,851	10,095
New England	44	17	27	90	36	16	1,457	2,360	1,481
Middle Atlantic	89	144	153	78	113	74	3,136	2,743	1 787
East North Central	175	242	314	362	232	261	6,211	880	972
West North Central	164	164	152	888	77	77	3,308	570	620
South Atlantic	334	591	779	2,829	2,681	2,121	2,055	180	641
East South Central	201	198	338	695	275	399	411	153	198
West South Central	274	297	447	4,037	2,845	1,535	327	98	173
Mountain	70	79	79	1,119	659	659	738	1,540	784
Pacific	182	122	122	140	229	229	596	2,327	1,729
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	967	314	135	755	357	576	11,822	10,463	10,463
New England	95	49	11	50	7	7	963	1,186	654
Middle Atlantic	250	91	29	65	42	48	2,078	1,651	1,814
East North Central	188	33	15	120	54	72	2,970	2,864	3,002
West North Central	61	8	7	60	49	49	1,275	1,097	1,223
South Atlantic	152	53	26	9	20	43	1,446	1,439	1,439
East South Central	64	20	19	20	21	35	563	785	849
West South Central	34	18	9	76	62	27	526	362	413
Mountain	19	11	8	63	20	20	642	330	405
Pacific	104	31	7	292	82	36	1,359	749	749
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	46	49	128	312	341	591	9,973	13,359	14,261
New England	0	0	0	16	10	14	778	1,876	1,342
Middle Atlantic	0	0	0	64	50	103	2,112	4,161	4,161
East North Central	29	21	45	32	37	66	2,466	3,279	3,279
West North Central	7	10	26	14	30	32	665	523	523
South Atlantic	1	1	1	32	75	113	1,695	1,186	1,420
East South Central	1	4	4	31	45	76	527	371	531
West South Central	6	6	19	76	48	107	526	688	424
Mountain	1	4	4	34	29	32	467	257	442
Pacific	1	3	8	13	17	36	737	1,018	1,018

[1] Mississippi and New York State excluded; New York City included.
[2] Mississippi excluded.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended December 4 there were 1,533 cases of diphtheria reported as compared with 1,854 for the corresponding period in 1942 and a 1938–42 median of 2,430 cases. The New England, West North Central, and Pacific regions reported excesses over the median; in the Mountain region the incidence was

about normal; and in the other 5 regions the numbers of cases were considerably below the normal seasonal expectancy.

Smallpox.—While the number of cases (46) of smallpox was only slightly below that for the corresponding period in 1942, it was less than 40 percent of the 1938–42 median. The situation was favorable in all sections of the country.

Typhoid and paratyphoid fever.—This disease remained at a relatively low level, the number of cases (312) reported being the lowest on record for this period. In the New England and Mountain regions the incidence was about normal, but in all other sections the disease was considerably less prevalent than in preceding years.

Whooping cough.—The incidence of whooping cough was also below normal for this season, 9,973 cases being reported for the current period as compared with a 1938–42 median of approximately 14,300 cases. Of the 9 geographic regions, 4 reported increases over the median, and in 5 sections the incidence was below normal. In the Middle Atlantic region the number of cases was only about half of the median figure, and in the West North Central region the current incidence was about 75 percent of the median.

MORTALITY, ALL CAUSES

For the 4 weeks ended December 4 there were approximately 36,100 deaths from all causes in the group of large cities reporting to the Bureau of the Census, an increase of 1,600 cases over the preceding 4-week period. While the death rate from all causes in these cities has been relatively high for the past year, there was a sharp upturn during the last week of the current period (week ended December 4), part of which is probably attributable to the sudden rise in the respiratory affections that occurred during the last week of the period and which was discussed above with influenza.

DEATHS DURING WEEK ENDED DECEMBER 11, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 11, 1943	Corresponding week, 1942
Data for 90 large cities of the United States:		
Total deaths	10,373	9,401
Average for 3 prior years	8,868	
Total deaths, first 49 weeks of year	445,120	415,304
Deaths under 1 year of age	655	723
Average for 3 prior years	625	
Deaths under 1 year of age, first 49 weeks of year	31,790	28,773
Data from industrial insurance companies:		
Policies in force	66,093,577	65,287,268
Number of death claims	12,621	12,427
Death claims per 1,000 policies in force, annual rate	10.0	9.9
Death claims per 1,000 policies, first 49 weeks of year, annual rate	9.6	9.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 18, 1943

Summary

Influenza epidemic.—The number of reported cases of influenza increased sharply during the week from 23,746 to 82,951. The 5-year (1938–42) median for the week is 2,995. The recent increases are comparable to those of approximately the corresponding period in 1940, when a mild influenza epidemic moved eastward from the Pacific coast along the southern States. However, the initial sharp increase in reported cases occurred a week or two earlier this year. Although the type of disease so far appears to be mild, there has apparently been a concomitant increase in urban mortality. Following are the weekly figures of reported cases during the 2 years, together with figures showing the deaths from influenza and pneumonia combined for 39 scattered cities, and the total mortality, all causes, for 90 large cities (ending dates for the weeks are as of 1943):

	Nov. 27	Dec. 4	Dec. 11	Dec. 18
Cases reported by State health officers:				
1943	2,465	4,489	23,746	82,951
1940	1,332	3,014	9,663	29,864
Deaths, influenza and pneumonia combined (39 cities):				
1943	254	381	459	832
3-year (1940–42) average	281	289	297	328
Total deaths, all causes (number of cities in parentheses):				
1943	8,450 (87)	9,565 (87)	10,373 (90)	11,379 (88)
1940 (88)	8,070	8,341	8,565	8,648

The weekly figures for influenza cases should be accepted with caution, from the standpoint of both completeness of reporting and accuracy of diagnosis. In most instances they represent the cases actually reported by physicians. Supplemental reports from the State health officers, however, indicate that many cases are not being

seen by physicians, that estimates of total cases of upper respiratory conditions based on absenteeism (in school and industry) range from 1 percent to 25 percent, and that the infection is of mild type. Up to the week ended December 18, based on the number of reported cases, the New England, Middle Atlantic, and Pacific States were apparently the least affected.

The incidence of most of the other important communicable diseases declined during the week, although measles, meningococcus meningitis, and poliomyelitis are above the 5-year median expectancy. A total of 280 cases of meningococcus meningitis was reported, as compared with 287 for the preceding week and 89 cases of poliomyelitis as compared with 96.

Telegraphic morbidity reports from State health officers for the week ended December 18, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended— Dec. 18, 1943	Week ended— Dec. 19, 1942	Median 1938–42	Week ended— Dec. 18, 1943	Week ended— Dec. 19, 1942	Median 1938–42	Week ended— Dec. 18, 1943	Week ended— Dec. 19, 1942	Median 1938–42	Week ended— Dec. 18, 1943	Week ended— Dec. 19, 1942	Median 1938–42
NEW ENGLAND												
Maine	3	0	0	88	-------	-------	104	13	52	4	5	0
New Hampshire	0	0	0	2	-------	-------	2	13	1	0	0	0
Vermont	0	0	0	-------	-------	-------	0	129	21	3	0	0
Massachusetts	5	2	5	-------	-------	-------	245	328	302	8	6	1
Rhode Island	1	3	1	35	1	-------	81	4	4	4	5	0
Connecticut	0	0	1	219	3	5	8	329	68	4	2	1
MIDDLE ATLANTIC												
New York	25	21	21	[1] 357	[1] 12	[1] 14	531	660	660	47	17	4
New Jersey	4	3	9	163	9	9	321	40	30	14	6	1
Pennsylvania	15	9	14	44	2	-------	506	867	723	20	7	8
EAST NORTH CENTRAL												
Ohio	11	15	15	2,625	9	13	1,180	52	52	7	0	1
Indiana	1	3	14	1,469	15	15	139	21	14	1	1	1
Illinois	4	22	41	416	10	14	166	83	40	31	6	1
Michigan [2]	5	3	10	148	31	7	535	51	155	16	2	2
Wisconsin	0	2	0	962	49	44	504	227	186	12	3	0
WEST NORTH CENTRAL												
Minnesota	8	2	1	185	1	1	549	8	66	4	0	0
Iowa	1	3	3	4,002	-------	1	44	46	46	0	0	0
Missouri	5	4	11	149	4	4	15	6	6	18	3	1
North Dakota	2	1	1	1,141	12	12	164	2	2	0	0	0
South Dakota	2	1	2	25	-------	-------	66	52	7	0	0	0
Nebraska	0	4	2	349	31	-------	15	60	8	1	1	0
Kansas	1	9	6	788	3	16	19	71	71	3	0	1
SOUTH ATLANTIC												
Delaware	0	0	0	4	-------	-------	11	0	3	1	1	0
Maryland [2]	3	9	9	218	5	9	30	11	11	6	6	0
District of Columbia	1	0	0	1,349	3	2	36	2	2	4	2	0
Virginia	8	11	36	9,349	233	228	636	17	30	8	7	1
West Virginia	4	11	11	2,062	34	15	91	2	9	2	3	3
North Carolina	10	17	44	119	-------	8	239	2	270	3	2	0
South Carolina	7	4	5	1,498	460	448	69	0	10	4	0	0
Georgia	7	14	14	1,219	59	80	77	9	10	2	0	0
Florida	2	8	8	102	4	11	19	4	3	1	0	0
EAST SOUTH CENTRAL												
Kentucky	3	12	12	[3] 34,148	5	13	10	29	13	2	0	3
Tennessee	10	8	10	391	40	47	25	23	36	6	0	1
Alabama	17	8	23	886	40	98	150	2	35	5	0	0
Mississippi [2]	4	15	13	-------	-------	-------	-------	-------	-------	3	0	0
WEST SOUTH CENTRAL												
Arkansas	6	18	16	2,663	90	140	36	22	23	2	0	1
Louisiana	9	9	11	58	2	9	8	3	3	1	1	1
Oklahoma	9	9	16	999	30	91	8	23	23	0	1	1
Texas	49	38	50	5,309	873	671	99	5	26	2	4	1
MOUNTAIN												
Montana	1	3	1	2,468	-------	12	112	75	28	1	0	0
Idaho	0	0	0	4	-------	-------	3	25	25	0	0	0
Wyoming	0	0	0	227	148	4	8	23	8	0	1	0
Colorado	3	18	12	820	54	42	192	12	12	1	1	1
New Mexico	4	3	3	124	-------	-------	3	0	21	3	2	0
Arizona	2	1	7	1,106	73	110	21	7	7	1	0	0
Utah [2]	0	1	1	1,205	1	33	4	510	45	3	0	0
Nevada	0	0	0	21	-------	-------	1	105	0	0	0	0
PACIFIC												
Washington	15	7	6	1,490	-------	1	52	440	160	6	4	1
Oregon	5	2	2	760	16	23	55	285	53	3	3	1
California	23	19	19	1,185	52	52	126	81	120	14	6	3
Total	295	352	486	82,951	2,414	2,995	7,315	4,779	4,779	281	108	43
50 weeks	13,255	14,995	16,145	209,594	103,437	176,258	587,903	496,067	496,067	17,098	3,495	1,958

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 18, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Dec. 18, 1943	Dec. 19, 1942		Dec. 18, 1943	Dec. 19, 1942		Dec. 18, 1943	Dec. 19, 1942		Dec. 18, 1943	Dec. 19, 1942	
NEW ENGLAND												
Maine	1	0	0	25	10	11	0	0	0	2	1	1
New Hampshire	0	0	0	5	3	3	0	0	0	2	0	0
Vermont	1	1	0	2	2	2	0	0	0	2	0	0
Massachusetts	3	1	1	193	267	169	0	0	0	1	5	3
Rhode Island	0	0	0	2	10	10	0	0	0	0	0	0
Connecticut	2	0	0	58	40	45	0	0	0	0	4	1
MIDDLE ATLANTIC												
New York	8	2	2	286	301	324	0	0	0	8	4	6
New Jersey	1	0	1	85	57	122	0	0	0	1	1	1
Pennsylvania	5	0	2	160	194	247	0	0	0	4	5	6
EAST NORTH CENTRAL												
Ohio	1	0	1	250	269	228	0	0	1	3	2	3
Indiana	0	0	0	40	29	108	1	1	1	0	0	3
Illinois	2	1	1	150	164	346	0	4	2	2	3	3
Michigan [2]	0	1	1	151	78	203	1	0	1	6	3	3
Wisconsin	0	0	0	135	174	160	0	0	3	1	0	1
WEST NORTH CENTRAL												
Minnesota	0	1	2	120	67	92	0	0	6	0	0	0
Iowa	1	0	1	55	45	75	1	1	2	2	3	1
Missouri	2	0	1	48	52	59	0	0	1	1	1	3
North Dakota	0	0	0	14	13	25	0	0	1	0	0	0
South Dakota	1	1	0	34	29	31	0	0	0	0	0	0
Nebraska	1	1	1	38	10	30	1	1	1	0	0	0
Kansas	4	2	1	101	70	70	0	1	1	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	3	5	11	0	0	0	0	0	0
Maryland [2]	1	0	0	43	37	51	0	0	0	0	1	3
District of Columbia	0	0	0	27	14	9	0	0	0	1	1	1
Virginia	0	0	0	38	37	45	0	0	0	0	4	5
West Virginia	0	1	1	58	42	52	0	1	0	0	0	1
North Carolina	0	2	2	72	67	78	1	1	0	0	3	3
South Carolina	0	1	1	12	9	12	0	1	0	0	0	1
Georgia	0	0	0	29	16	35	0	0	0	5	1	4
Florida	1	3	0	7	12	6	0	0	0	2	1	2
EAST SOUTH CENTRAL												
Kentucky	6	0	1	45	52	77	1	0	0	4	9	3
Tennessee	0	1	0	47	37	60	0	0	0	3	1	1
Alabama	0	0	1	10	23	23	1	0	0	2	0	1
Mississippi [2]	1	1	1	4	8	16	0	1	0	0	2	2
WEST SOUTH CENTRAL												
Arkansas	1	0	0	11	5	16	0	0	1	2	0	4
Louisiana	1	0	0	8	3	7	1	0	0	4	1	7
Oklahoma	1	0	1	22	13	27	0	0	4	1	1	3
Texas	3	26	1	52	55	55	3	2	2	4	6	6
MOUNTAIN												
Montana	0	0	0	48	12	24	0	0	1	0	0	1
Idaho	0	0	0	40	10	13	0	0	0	1	0	1
Wyoming	0	0	0	6	25	8	0	0	0	0	0	0
Colorado	0	0	0	31	35	28	0	0	0	0	1	1
New Mexico	2	0	0	5	4	10	0	0	0	1	3	2
Arizona	1	2	1	14	3	5	0	0	0	0	0	0
Utah [2]	8	0	0	94	49	26	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	1	0	0
PACIFIC												
Washington	0	3	3	114	21	37	0	0	0	0	1	0
Oregon	14	0	0	52	16	19	0	0	0	0	0	1
California	16	9	3	171	136	136	0	0	2	4	4	4
Total	89	60	60	3,015	2,630	3,130	11	14	62	70	72	119
50 weeks	12,319	4,107	7,203	134,742	121,468	149,649	724	764	2,354	5,376	6,603	9,405

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 18, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended Dec. 18, 1943								
	Week ended—		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Dec. 18, 1943	Dec. 19, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	6	39	45	0	0	0	0	0	0	0	0	0
New Hampshire	0	8	8	0	0	0	0	1	0	0	0	0
Vermont	10	41	41	0	0	0	0	0	0	0	0	0
Massachusetts	70	308	226	1	0	0	5	0	0	0	0	0
Rhode Island	6	40	34	0	0	0	0	0	0	0	0	0
Connecticut	19	80	86	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	196	410	430	0	3	19	0	3	0	0	0	0
New Jersey	49	152	174	0	0	0	0	0	0	0	0	0
Pennsylvania	99	323	323	1	0	0	0	0	0	0	1	0
EAST NORTH CENTRAL												
Ohio	66	205	216	0	0	0	0	0	0	0	2	0
Indiana	14	16	16	0	0	0	0	0	0	0	3	0
Illinois	52	162	176	0	0	2	0	1	0	0	2	0
Michigan [2]	128	232	272	0	3	0	0	0	0	0	1	0
Wisconsin	177	297	273	0	0	0	0	2	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	28	72	67	0	2	0	0	0	0	0	0	0
Iowa	19	27	16	0	0	0	0	0	0	0	0	0
Missouri	12	10	20	0	0	0	1	0	0	0	1	0
North Dakota	6	15	11	0	0	0	0	0	0	0	0	0
South Dakota	5	3	2	0	0	0	0	0	0	0	0	0
Nebraska	13	12	3	0	0	0	0	0	0	0	0	0
Kansas	16	41	33	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC												
Delaware	8	6	6	0	0	0	0	0	0	0	0	0
Maryland [2]	46	79	71	0	0	0	0	0	0	0	0	0
District of Columbia	1	14	14	0	0	0	0	0	0	0	0	0
Virginia	100	43	48	0	0	0	34	0	0	0	1	1
West Virginia	43	5	24	0	0	0	0	0	0	0	0	0
North Carolina	117	28	118	0	0	0	0	0	0	0	2	7
South Carolina	95	29	29	0	0	4	0	0	0	0	0	0
Georgia	9	6	9	0	0	4	0	0	0	0	0	18
Florida	22	2	4	0	1	1	0	0	0	0	0	2
EAST SOUTH CENTRAL												
Kentucky	68	23	60	0	0	0	0	0	0	0	1	0
Tennessee	23	35	35	0	0	0	2	0	0	0	1	1
Alabama	15	126	50	0	0	0	0	0	0	0	2	16
Mississippi [2]	------	------	------	0	0	0	0	0	0	0	0	2
WEST SOUTH CENTRAL												
Arkansas	17	18	11	0	1	0	0	0	0	0	0	1
Louisiana	5	5	4	0	0	1	0	0	0	0	0	6
Oklahoma	3	5	4	0	0	0	0	0	0	0	0	0
Texas	126	145	90	0	15	420	0	0	0	0	0	33
MOUNTAIN												
Montana	3	10	14	0	0	0	0	0	0	0	0	0
Idaho	1	3	3	0	0	0	0	1	0	0	0	0
Wyoming	6	3	3	0	0	0	0	0	0	0	0	0
Colorado	31	14	38	0	0	0	0	0	0	0	0	0
New Mexico	11	3	16	0	0	3	0	1	0	0	0	0
Arizona	16	1	5	0	0	0	9	0	0	0	0	0
Utah [2]	19	27	23	0	0	0	0	0	0	0	1	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	64	32	32	0	0	0	0	0	0	0	0	0
Oregon	30	2	16	0	0	0	0	0	0	0	0	0
California	83	203	151	0	3	9	0	0	0	0	0	2
Total	1,953	3,360	3,633	2	28	463	51	9	0	0	19	89
50 weeks	173,808	172,823	172,629	65	2,078	17,562	4,281	669	29	435	765	4,393
50 weeks, 1942	------	------	------	78	1,147	11,887	6,327	549	45	451	859	3,585

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Later reports from Kentucky show, for the week ended Dec. 11, an estimated total of more than 35,000 cases instead of the 5,416 originally reported by telegraph.
[4] Including paratyphoid fever cases reported separately as follows: Massachusetts, 1; Illinois, 1; Georgia, 1; Florida, 2; Kentucky, 2; Tennessee, 1; California, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 4, 1943

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	13	0	4	0	8	0	0	[illegible]
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	1	0	0	[illegible]
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	[illegible]
Massachusetts:												
Boston	4	0	------	0	25	9	15	0	35	0	0	3[illegible]
Fall River	0	0	------	0	0	0	3	0	3	0	0	[illegible]
Springfield	0	0	------	0	3	0	1	0	14	0	0	[illegible]
Worcester	0	0	------	0	0	0	6	0	21	0	0	[illegible]
Rhode Island:												
Providence	0	0	1	0	61	1	4	0	2	0	0	1[illegible]
Connecticut:												
Bridgeport	0	0	------	0	0	0	5	0	9	0	0	[illegible]
Hartford	0	0	------	0	0	1	0	1	8	0	0	
New Haven	0	0	1	0	1	0	2	0	3	0	1	
MIDDLE ATLANTIC												
New York:												
Buffalo	1	0	------	2	4	2	3	0	7	0	0	
New York	10	1	14	4	253	22	78	7	138	0	7	4
Rochester	0	0	------	0	1	1	6	0	5	0	0	
Syracuse	0	0	------	0	0	1	2	0	2	0	0	3
New Jersey:												
Camden	1	0	1	0	0	0	0	0	8	0	0	
Newark	0	0	5	0	3	1	4	0	7	0	0	
Trenton	0	0	1	0	1	0	5	0	7	0	0	
Pennsylvania:												
Philadelphia	2	0	5	3	6	10	34	3	43	0	0	2
Pittsburgh	2	0	------	0	137	6	19	0	26	0	2	
Reading	0	0	------	1	0	1	3	0	1	0	0	
EAST NORTH CENTRAL												
Ohio:												
Cleveland	0	0	2	0	75	4	9	0	50	0	0	3
Columbus	1	0	1	1	3	1	5	0	17	0	0	2
Indiana:												
Fort Wayne	0	0	------	0	1	0	0	0	0	1	0	
Indianapolis	1	0	------	3	0	0	6	0	16	0	0	
South Bend	0	0	------	0	46	0	0	2	0	0	0	
Terre Haute	0	0	------	0	0	0	0	0	1	0	0	
Illinois:												
Chicago	3	0	14	0	14	11	36	2	54	0	2	4
Springfield	0	0	55	0	15	0	2	0	1	0	0	
Michigan:												
Detroit	5	1	3	1	5	8	22	1	50	0	1	4
Flint	0	0	------	0	12	0	2	0	9	0	0	
Grand Rapids	0	0	------	0	22	0	0	0	3	0	0	
Wisconsin:												
Kenosha	0	0	------	0	0	0	5	0	3	0	0	
Milwaukee	0	0	4	4	8	2	8	0	38	0	0	8
Racine	0	0	------	0	0	0	3	0	5	0	0	
Superior	0	0	------	0	103	0	0	0	0	0	0	
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	20	0	1	0	6	0	0	2
Minneapolis	10	0	------	1	59	2	1	0	30	0	0	
St. Paul	1	1	------	1	38	2	3	0	11	0	0	2
Missouri:												
Kansas City	1	0	2	0	8	1	5	0	18	0	0	
St. Joseph	0	0	------	0	0	0	0	0	1	0	0	
St. Louis	0	0	6	0	0	3	29	0	13	0	0	1

City reports for week ended Dec. 4, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	13	0	1	0	0	0	0	0
Nebraska:												
Omaha	6	0	------	0	0	0	6	0	7	0	0	2
Kansas:												
Topeka	0	0	------	0	0	0	4	0	1	0	0	8
Wichita	0	0	------	0	5	0	5	0	3	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	1	0	------	0	2	0	3	0	0	0	0	2
Maryland:												
Baltimore	4	0	4	2	15	6	24	0	24	0	1	25
Cumberland	0	1	------	0	0	0	1	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	4	0	13	2	10	0	25	0	0	4
Virginia:												
Lynchburg	0	0	------	0	403	0	0	0	1	0	0	11
Richmond	0	0	------	0	7	2	1	0	5	0	0	2
Roanoke	0	0	------	0	0	0	0	0	0	0	0	1
West Virginia:												
Charleston	0	0	------	0	9	0	0	0	5	0	0	0
Wheeling	0	0	------	0	0	0	1	0	0	0	0	0
North Carolina:												
Winston-Salem	0	0	------	0	8	0	0	0	2	0	0	1
South Carolina:												
Charleston	0	0	62	0	11	1	1	0	1	0	0	0
Georgia:												
Atlanta	1	0	57	1	2	0	5	0	1	0	0	0
Brunswick	1	0	------	0	10	1	0	0	1	0	0	0
Savannah	0	0	1	0	0	1	1	0	7	0	0	0
Florida:												
Tampa	0	0	------	0	0	1	4	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	55	4	2	1	4	0	1	0	0	6
Nashville	0	0	------	0	1	0	0	0	4	0	0	1
Alabama:												
Birmingham	0	0	7	2	10	0	2	0	4	0	0	1
Mobile	0	0	------	1	0	1	2	0	2	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	2	0	1	0	3	0	0	0	0	1
Louisiana:												
New Orleans	2	0	5	3	0	0	11	2	11	0	0	0
Shreveport	0	0	------	0	0	0	4	0	1	0	0	0
Texas:												
Dallas	1	0	------	0	0	0	7	0	2	0	1	2
Galveston	0	0	------	0	0	0	1	0	0	0	0	0
Houston	2	0	------	0	1	0	11	0	1	0	0	0
San Antonio	1	0	1	1	3	0	7	2	0	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	1
Great Falls	0	0	------	0	34	0	0	0	1	0	0	1
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	1	0	4	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	4	0	0	0
Colorado:												
Denver	2	0	45	0	4	1	8	0	1	0	0	37
Pueblo	0	0	------	0	68	0	1	1	3	0	0	2
Utah:												
Salt Lake City	0	0	------	0	7	0	1	2	14	0	0	1

City reports for week ended Dec. 4, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	1	0	------	1	5	2	4	0	3	0	0	18
Spokane	0	0	------	0	11	0	2	0	22	0	1	1
Tacoma	0	0	------	0	4	0	0	1	15	0	0	8
California:												
Los Angeles	9	0	9	2	15	2	5	7	35	0	0	11
Sacramento	1	0	------	0	0	0	2	0	1	0	0	0
San Francisco	1	0	------	1	1	2	8	4	11	0	1	6
Total	75	4	367	39	1,602	112	477	35	892	1	17	604
Corresponding week, 1942	84	2	119	25	968	29	404	16	844	0	19	1,182
Average, 1938–42	108	------	460	[1] 30	[2] 920	------	[1] 384	------	837	5	22	1,195

Dysentery, amebic.—Cases: Boston, 2; New York, 2; Atlanta, 1; San Francisco, 1.

Dysentery, bacillary.—Cases: Worcester, 2; New York, 10; Syracuse, 1; Philadelphia, 1; Detroit, 13; Charleston, S. C., 2; Los Angeles, 6.

Dysentery, unspecified.—Cases: San Antonio, 9.

Tularemia.—Cases: Providence, 1; Pittsburgh, 1; Fort Wayne, 1.

Typhus fever.—Cases: Charleston, S. C., 5; Savannah, 1; Birmingham, 1; Mobile, 14; New Orleans, 3; San Antonio, 1.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1942, 34,197,200)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Tyhpoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	9.9	0.0	5.0	0.0	256	27.3	99.4	2.5	246	0.0	2.5	179
Middle Atlantic	7.1	0.4	11.6	4.5	181	19.6	68.7	4.5	109	0.0	4.0	57
East North Central	6.2	0.6	48.8	5.6	188	16.1	57.4	3.1	152	0.6	1.9	119
West North Central	35.2	2.0	15.6	3.9	279	15.6	107.5	0.0	176	0.0	0.0	135
South Atlantic	12.1	1.7	222.1	5.2	833	24.3	88.5	0.0	125	0.0	1.7	80
East South Central	0.0	0.0	368.2	41.6	77	11.9	47.5	0.0	65	0.0	0.0	48
West South Central	17.6	0.0	23.5	11.7	15	0.0	129.1	11.7	44	0.0	2.9	9
Mountain	16.1	0.0	361.8	0.0	908	8.0	88.4	24.1	217	0.0	0.0	338
Pacific	21.0	0.0	15.7	7.0	63	10.5	36.7	21.0	152	0.0	3.5	77
Total	11.4	0.6	56.0	5.9	244	17.1	72.7	5.3	136	0.2	2.6	92

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—For the week ended December 4, 1943, 62 new cases of dengue fever were reported in Honolulu, T. H., bringing the total number of cases to date to 1,250.

Plague (rodent).—A rat found on November 17, 1943, in Kapulena area, Hamakua District, Island of Hawaii, T. H., has been proved positive for plague.

Panama Canal Zone

Notifiable diseases—October 1943.—During the month of October 1943, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	2				4		2		8	
Diphtheria	7				1		1		9	
Dysentery (bacillary)	3				1				4	
Malaria [1]	15		3		177	1	70	1	265	2
Measles					1				1	
Mumps	15		17		101		6		139	
Paratyphoid fever	1				1		1		3	
Pneumonia		17		2	10			1	[2] 10	20
Scarlet fever			1						1	
Tuberculosis		24		4	3	2		10	[2] 8	40
Typhoid fever	1								1	
Typhus fever					1				1	
Whooping cough		1								1

[1] 67 recurrent cases.
[2] Reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended November 20, 1943.—During the week ended November 20, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		9	1	299	401	77	106	148	133	1,174
Diphtheria	1	13	3	42	3	7	4		1	74
Dysentery (bacillary)				1					5	6
Encephalitis, infectious						1				1
German measles		1		5	10		1	6	8	31
Influenza					12				19	31
Measles		1		293	130	9	1	43	23	500
Meningitis, meningococcus			1	1	2				1	5
Mumps		2		31	124	44	3	26	168	398
Poliomyelitis			1	2		1			1	5
Scarlet fever		3	8	116	106	52	21	31	53	390
Tuberculosis (all forms)			5	135	51	10		25	18	244
Typhoid and paratyphoid fever			2	10		1	1		5	19
Undulant fever					2				2	4
Whooping cough		23		206	162	23	20	15	61	510

PARAGUAY

Asuncion—Poliomyelitis.—A report dated December 3, 1943, states that the incidence of poliomyelitis has increased gradually in Asuncion for the past 2 weeks, where about 35 cases have occurred, with 5 to 10 cases occurring in the outlying districts near Asuncion.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Azores.—During the year 1942, 54 cases of plague including 3 cases of pneumonic plague and 2 cases of septicemic plague were reported among the civil population of the Azores. Two cases of plague among the military population were also reported. The report also states

that for the year 1943 up to November 19, about the same number of cases of plague have occurred.

Ecuador—Loja Province.—During the period October 16–31, 1943, 2 cases of plague, with 1 death, were reported in Loja Province, Ecuador.

Madagascar.—During the period July 1–October 31, 1943, 13 cases of plague were reported in Madagascar.

Morocco—Casablanca.—During the period November 1–10, 1943, 4 cases of plague were reported in Casablanca, Morocco.

Typhus Fever

Guatemala.—During the month of October 1943, 145 cases of typhus fever, with 22 deaths, were reported in Guatemala.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

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Public Health Reports

VOLUME 58 **DECEMBER 31, 1943** NUMBER 53

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Surveys of Mental Disorder in Sample Populations

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Public Health Reports

Vol. 58 • DECEMBER 31, 1943 • *No. 53*

A SURVEY OF STATISTICAL STUDIES ON THE PREVALENCE AND INCIDENCE OF MENTAL DISORDER IN SAMPLE POPULATIONS [1]

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Intelligent planning for action in the field of mental hygiene requires knowledge of the magnitude of the problem. It is therefore necessary to ascertain the prevalence and incidence of mental hygiene problems in the general population. "Prevalence" is understood as referring to the number of cases active at a given moment, "incidence" to the number of new cases occurring either during an arbitrary period, usually a year, or during the life span of a group of individuals. In the latter case the rates are often referred to as "expectancies."

Attempts at complete enumeration of mental deviants have been made at various times in many countries in connection with the national censuses. Such attempts have been generally unsuccessful because of widespread failure on the part of informants and enumerators to recognize or report any but the most obvious cases.

Machinery for the general reporting of new cases of mental disorder does not exist in any country and for obvious reasons is not likely to be established. It is believed that in communities with an adequate and well established system of mental hospitals most psychotics find their way into these hospitals at some time during their lives, even though they spend a considerable part of their period of illness on the outside. For such populations rates of first admissions have been used as a substitute for incidence rates (*18, 28, 32, 41*). This method however, is not suitable for forms of mental disorder which do not as a rule require or receive institutional care.

The difficulties standing in the way of even approaching complete coverage of all cases of mental disorder in any large geographical or political unit have thus far proved insurmountable. The only practicable way yet discovered to approach the problem is to gather

[1] This study was made with the support of the International Health Division of the Rockefeller Foundation.

information about prevalence and incidence in population samples. Such investigations have been carried out in various parts of the world.

The present paper is a critical survey of these studies. We have endeavored to report on all major investigations conducted and published during the last 15 years. There are few earlier studies of this type and these do not furnish much information of value because psychiatric concepts have changed radically since they were made. The progressive breakdown of international scientific relations makes it somewhat uncertain that all investigations have been discovered in the literature. All studies included cover a wide range of mental hygiene problems and were made on reasonably "average" populations. Investigations of single specific problems or on highly selected populations have been omitted.

Attention will first be given to five studies of *prevalence*. The earliest of these surveys was made in 1930 by Carl Brugger (*8*) in 116 villages in Thuringia with a total population of about 38,000. Only four of these communities have over a thousand inhabitants. The area is mixed agricultural-industrial in character. Most of the people are Protestants.

In the following years Brugger made two more surveys, one in five villages of the Bavarian Allgäu (*10*) and one in six villages east of the town of Rosenheim (*11*). These surveys were part of a larger study intended to cover several areas with a total population of about 50,000 inhabitants. We have been unable to find any other publications on this investigation besides Brugger's two papers. The Allgäu and Rosenheim areas are very similar in character; both are predominantly agricultural and almost exclusively Catholic. As the same technique was used in both instances and the total population was less than 9,000 the two appear combined in this review under the name "Bavaria survey."

In 1935 Erik Strömgren (*40*) carried out a mental hygiene survey on an island in the Baltic Sea, Bornholm, which belongs politically to Denmark. It has a population of 46,000; the chief sources of income are farming, fishing, quarrying, and tourist trade. The results of Strömgren's investigation are available in book form, including analyses of both prevalence and incidence of mental disorder.

Turning now to the United States we find two large community surveys of mental hygiene problems, one in Baltimore and one in Tennessee.[2] The Baltimore survey is limited to the Eastern Health District, an area of about one square mile in the eastern part of the city. The District serves as the field laboratory of the Johns Hopkins University School of Hygiene and Public Health. Two surveys were made here,

[2] Both supported by the International Health Division of the Rockefeller Foundation.

one in 1933 (*13, 14, 15, 16*) and a second in 1936 (*20, 21, 22, 23*). All further statements in this paper refer to the survey of 1936. At this time the Eastern Health District had 55,000 inhabitants of whom 23 percent were Negroes. Among the whites there are many families of Hebrew and of Czech extraction. The area is for the most part residential, and the income level for both white and Negro families is definitely below the average for the city.

Finally there is the survey of Williamson County, Tennessee (*34*), giving information as of September 1, 1938. Williamson County is a fairly typical agricultural county in middle Tennessee with an area of 586 square miles and a population of 25,000. About 78 percent of the people are native whites, mostly of English and Scotch-Irish extraction; 22 percent are Negroes. There is only one incorporated town, Franklin, with about 4,000 inhabitants.

It will be noted that none of the surveyed populations is anything like a representative sample of the national population of which it is a part, be it Germany, Denmark, or the United States. Bornholm is the only one of the survey areas which might be called a "natural" unit. Future investigators in this field will probably spend greater efforts upon the proper selection of sample populations. A well coordinated survey, conducted simultaneously in several urban and rural areas of the United States or other large countries, should yield more complete information on the prevalence of mental disorder than has hitherto been available. The classic mental deficiency survey (*27*) made in England from 1925 to 1927 might well serve as a model.

Bona fide residents of the survey areas who have become inmates of institutions located elsewhere are included in all studies.

In the following analysis the term "case finding" is used for the basic procedures by which individuals presenting problems in the field of mental hygiene become known to the investigator. The determination of the specific nature of the problem, and of the degree of deviation, is called diagnosis. The two may be carried out either separately or as one operation.

Brugger initiated his Thuringia survey by questionnaires sent to physicians, clergymen, teachers, and mayors in the area. Additional material was obtained by oral inquiries from the relatives of patients already known and from "older inhabitants" of the several villages. The files of hospitals, institutions, and prisons were also searched, in one case as far back as 30 years. Almost all reported cases were personally seen and diagnosed by the author. He mentions that he also examined a large number of individuals described to him as normal and that he feels satisfied as to the good mental health of these persons.

The investigation in Bavaria was much more intensive. The population was prepared by publicity in the local newspapers, by

announcement from the pulpit by the parish priests, and by notices on the communal bulletin boards by the mayors. Subsequently every family in the area was visited by the psychiatrist. A fairly complete history was taken for each individual and the diagnosis made on the basis of a personal examination. Reports from hospitals, institutions, physicians, teachers, etc., were utilized in checking the information given by the family. In this study case finding and diagnosis were combined.

Procedures in the Bornholm survey were closely patterned after Brugger's investigation in Thuringia. The records of mental and general hospitals, almshouses, and nursing homes were searched and oral information obtained from physicians, aldermen, clergymen, teachers, city officials, and "older inhabitants." Most cases were visited and examined by the author.

It should be mentioned that Strömgren also carried out a very intensive survey of one village on the island with the help of the local medical practitioners. This community, however, had only 900 inhabitants and therefore this phase of his investigation is not reviewed here in detail. It may be worth mentioning that the general prevalence rate computed for this village is five to six times as high as that found for the whole island by the less inclusive general investigation. This is approximately the same ratio as between Brugger's surveys in Bavaria and Thuringia.

In the Baltimore survey there was no reporting of cases directly to the investigating group. Case finding was carried out entirely by perusal of the written records of various institutions and agencies. This procedure was made possible by the high development of health and social services in the area under study. The total number of sources was 43, including, among others, public and private mental hospitals, training schools for mental defectives and for delinquents, psychiatric clinics, social agencies, certain departments of the public school system, the juvenile court, police and criminal courts, and the National Health Survey. In many of the cases thus discovered a psychiatric diagnosis or a more or less complete description by a competent social worker was available. Others, however, were included on the basis of circumstantial evidence. Diagnosis, where not already given in the medical sources, was made from the written records after careful study of the data. No cases were personally examined by the staff psychiatrist. This is probably a serious shortcoming in the investigative technique.

The material for the Tennessee survey was partly reported by key persons in the community—physicians, nurses, teachers, ministers, judges, postmasters, country storekeepers, etc.—and partly discovered by the field workers of the study, who spent years in the town participating extensively in many community activities of various kinds.

Institutional records were also searched. Somewhat over half of the cases were interviewed or examined by one or more members of the staff which consisted of a psychiatrist, social workers, and nurses.

In addition to this general investigation, an intensive house-to-house survey was conducted in three selected areas. Details are not yet available for this phase of the study beyond the fact that the prevalence rate for all types of problems was about twice as high in these areas as in the remainder of the county.

Considerable differences exist between the five surveys as to the types of mental hygiene problems included and as to the grouping into diagnostic categories. The three European studies are limited to psychiatric conditions in the narrower sense.

The Thuringia survey covers all "psychoses"—this term as used by Brugger includes epilepsy and hysteria—and, in addition, neurasthenia, psychopathic personalities so badly maladjusted that they themselves or their families suffered severely, chronic alcoholics showing moral, social, or economic deterioration, some so-called eccentrics, a few "neurologic" patients, and, finally, imbeciles and idiots. That the cases of mental deficiency were diagnosed on the basis of clinical evidence rather than by standardized tests is evident from the statement that the mental age of the imbeciles is between 6 and 12 years and the mental age of the idiots less than 6 years. These mental ages obviously do not describe the same intelligence levels as they would in this country. So far as the major psychoses are concerned, German and American terminology appear to be reasonably comparable, at least as regards the more common diseases, such as schizophrenia, manic-depressive psychosis, general paresis, arteriosclerotic psychosis, etc.

Scope and classification in the Bavarian investigation are essentially the same except that a large group of morons ("debil") and retarded individuals is included.

Strömgren states that he enumerated only the "psychoses" in his survey of Bornholm, but from the list of diagnostic groupings it appears that the term "psychosis" again covers not only what we generally mean thereby but also epilepsy and conditions which would be classified as psychoneuroses or minor psychoses in American practice. Most of Strömgren's subgroups can be identified easily although some of the terms are unfamiliar, as for example "depressio mentis" (reactive depression), "confusio mentis" (delirium), and a few more. Mental defectives were not systematically searched for but the author believes that the majority of the more severe oligophrenics are included. These cases are described as requiring special care and would probably have been classified as idiots or imbeciles in this country.

The American surveys are more ambitious and cover a much wider range of mental hygiene problems. The Baltimore group uses the following system of classification (*20*) which is planned to designate all known maladjusted individuals.

Psychosis.
Psychoneurosis.
Psychopathic personality.
Personality disorder in adults:
  Psychotic traits.
  Neurotic traits.
  Psychopathic traits.
  Behavior deviation.
Behavior disorder in children:
  Neurotic traits.
  Conduct problems.
Minor or possible disorder in adults and children.
Epilepsy.
Mental deficiency (I. Q. less than 70).
School progress problems without mental deficiency.
Adult delinquency without other information.

Under the title "personality disorders in adults" four different groups of cases are combined. The first three of the groups may be termed subclinical—that is, they include individuals in whom the clinical picture was not complete enough to justify their placement in a more sharply defined category. The fourth group covers a wide array of severely maladjusted personalities not otherwise definable and chiefly characterized by their interpersonal difficulties. The maladjustment ranges all the way from aggressiveness to submissiveness, including traits like deception, irritability, quarrelsomeness, uncooperativeness, chronic dependency, inefficiency, shiftlessness, suggestibility, unreliability, and so on. Severe alcoholics who are not psychotic are also included here.

"Behavior disorder in children" has two subdivisions: neurotic traits and conduct disturbances. Widely different problems are covered by the term "neurotic traits," including tics, habit spasms, stuttering, temper tantrums, enuresis, nail biting, and so on. Conduct problems are chiefly juvenile delinquency and school misbehavior.

The group called "minor or possible disorder" is very heterogeneous. It contains some cases with adequate records but minor problems, and others with very scanty information suggesting serious maladjustment.

In the Tennessee survey a somewhat different system of classification (*34*) was used but it includes about the same range of mental hygiene problems as is covered in Baltimore. The only group of cases in the Tennessee tabulations which has no counterpart in Baltimore is a number of individuals who because of constitutional or environmental handicaps are considered liable to become mental

hygiene problems although they were still well enough adjusted when investigated. The material is presented in seven major groupings.

Psychosis.
Psychoneurosis.
Conduct and behavior problems.
Psychopathic traits.
Special personality types.
Mental deficiency.
Organic and miscellaneous conditions.

The "conduct and behavior problems" embrace major and minor delinquency of adults, juvenile delinquency, alcoholism, marital maladjustment, sexual promiscuity, etc. "Psychopathic traits" are such adult personality types as the schizoid, cyclothymic, and hysterical, and also the so-called neurotic traits of childhood, tics, enuresis, temper tantrums, etc. The group of "special personality types" includes, in addition to various minor deviations, many persons of borderline intelligence. Among the "organic and miscellaneous" conditions we find the epileptics, patients suffering from various diseases of the brain and nervous system, persons with endocrine and other general diseases and congenital abnormalities, cripples, and individuals living in an unfavorable home environment. The large majority of cases in this group are listed only as potential mental hygiene problems.

By definition a study of prevalence is based upon the number of cases active on a given day which may be called the census day for the particular survey. For certain types of problems in the field of mental hygiene the determination of activity status presents great difficulties, both practical and theoretical. The situation is simple in conditions of a permanent nature like mental deficiency where a case known to be present on census day must also be active. It is less simple in psychoses and similar illnesses; by careful investigation, however, it is possible to determine the time of onset or recovery within reasonable limits. But how long is a person a "delinquent" before, after, or between his criminal acts? This conundrum can only be answered arbitrarily.

Brugger does not discuss the question of activity status in his papers, but it appears that he counts as psychotics all individuals who have been mentally disordered at any time during their lives. This attitude probably reflects the importance attached to the constitutional factor by the German school of psychiatry.

Strömgren presents separately the numbers of active and recovered cases only for his total series of "psychotics" which includes epileptics and many psychoneurotics. The distinction is not made for each diagnostic group separately.

The Baltimore investigation includes all cases active at some time

during the survey year, and no others with the exception that an effort was made to ascertain the number of residents who had previously suffered from a psychosis. Such individuals, however, are not counted as active. The prevalence rates of the Baltimore survey are one-year rather than one-day rates. They cannot be converted easily into true prevalence rates.

In Tennessee it was possible to follow up all reported cases and to verify not only their continued residence in the county on census day but also to determine their activity status at that time. Among the active cases a further distinction was made between personal problems affecting only the patient and his immediate family and social problems involving the community at large. In each of these categories, severe, moderate, and minor deviations are distinguished. Such tabulations are available for the seven major diagnostic groups.

The possibilities of reaction inherent in the human personality are so manifold that it is small wonder that many individuals presenting mental hygiene problems require double or multiple diagnoses. This becomes particularly apparent in the two American prevalence surveys with their broad conception of the field. In both instances the difficulty has been overcome by the establishment of a rank order of diagnostic groups, descending, by and large, from more severe to less severe deviations. Each case with multiple diagnoses is assigned to the highest ranking group represented. This is called the leading classification or primary diagnosis and is generally, but not always, the most important condition as far as the individual is concerned. In addition there is available for certain diagnostic groups the total number of cases falling into that group irrespective of primary diagnosis. Among these groups is mental deficiency which often exists coincidentally with other conditions.

Brugger's papers report only a few cases with double diagnoses and those are listed individually. The Bornholm survey includes three duplications but no details are available.

It cannot fall into the scope of this review to reproduce in detail the findings of each survey. For complete information the reader is referred to the original publications. It does seem proper, however, to present in summary form the numbers of cases found in each diagnostic group and the crude prevalence rates per 1,000 general population, using the author's own system of classification. Later—and with considerable hesitation—the attempt will be made to rearrange the material for purposes of comparison. In all tables the range of sampling variation is indicated by 95 percent confidence limits.

Table 1 summarizes the findings of Brugger's two surveys in Thuringia and Bavaria. Although the population covered in the latter study was only one-fourth of that in the former, the number of cases found is larger. The prevalence rate for the aggregate of all forms of

mental disorder is almost five times as high. This difference is partly due to the inclusion of morons and persons with borderline mental deficiency and partly to the fact that a personal investigation was made by the psychiatrist of every family included in the Bavaria survey. This is suggested by the fact that the discrepancy appears largest for those types of mental disorder which are most likely to escape recognition and reporting by lay persons.

TABLE 1.—*Cases of mental disorder in the Thuringia and Bavaria surveys*

[Population: Thuringia survey 37,561; Bavaria survey 8,628]

	Number of cases		Rate per 1,000		95 percent confidence limits	
	Thuringia	Bavaria	Thuringia	Bavaria	Thuringia	Bavaria
Schizophrenia	73	22	1.9	2.5	1.5–2.4	1.5–3.6
Manic-depressive	20	12	.5	1.4	.3–.8	.6–2.2
Epilepsy	26	12	.7	1.4	.4–1.0	.6–2.2
Cerebral arteriosclerosis	13	3	.3	.3	.2–.5	.0–.7
Hysteria	32	7	.9	.8	.6–1.1	.2–1.4
Infectious psychosis	11		.3		.1–.5	
Undiagnosed psychosis	16	7	.4	.8	.2–.6	.2–1.4
Neurasthenia	15	7	.4	.8	.2–.6	.2–1.4
Psychopathic personality	25	24	.7	2.8	.4–.9	1.7–3.9
Alcoholism	15	22	.4	2.5	.2–.6	1.5–3.6
Eccentrics	6	14	.2	1.6	.0–.3	.8–2.5
Imbeciles and idiots	201	137	5.4	15.9	4.6–6.1	13.2–18.5
Morons		158		18.3		15.5–21.2
Retarded		88		10.2		8.1–12.3
Miscellaneous conditions [1]	36	12	1.0	1.4	.6–1.3	.6–2.2
Total	479	517	12.8	59.9	11.6–13.9	54.8–65.1
Duplications	10	8				

[1] General paresis, cerebral syphilis, senile and presenile dementia, climacteric and reactive depression, puerperal psychosis, postencephalitic states, brain tumor, sequelae to concussion of the brain, migraine, postoperative tetany, and exogenous oligophrenia. None of these groups had over 10 cases in either survey.

Strömgren's figures for Bornholm are presented in table 2. His material does not include psychopathic personalities, alcoholics, and eccentrics and is therefore smaller in scope than Brugger's; otherwise the picture seems to be reasonably similar.

TABLE 2.—*Active and recovered cases of mental disorder in the Bornholm survey*

[Population: 45,930]

	Number of cases	Rate per 1,000	95 percent confidence limits
Schizophrenia	150	3.3	2.7–3.8
Manic-depressive	122	2.7	2.2–3.1
Epilepsy	47	1.0	.7–1.3
Psychogenic psychoses	34	.7	.5–1.0
Hysterical psychoses	35	.8	.5–1.0
Paranoid psychosis	13	.3	.1–.4
Confusio mentis	15	.3	.2–.5
Depressio mentis	49	1.1	.8–1.4
Other psychoses [1]	22	.5	.3–.7
Atypical psychoses	13	.3	.1–.4
Undiagnosed psychoses	28	.6	.4–.8
Oligophrenia	191	4.2	3.6–4.7
Total	716	15.6	14.4–16.7
Duplications	3		

[1] General paresis; psychoses with organic brain disease; senile, presenilo, and arteriosclerotic dementia; and alcoholic psychoses. There were less than 10 cases in each of these groups.

The data for the Eastern Health District of Baltimore shown in table 3 introduce a quite different type of coverage, reaching far beyond the ranks of individuals manifestly mentally disordered. The psychotics, psychoneurotics, and psychopathic personalities who may together be called the "clinical" group furnish only 17 percent of all cases and even the inclusion of the "subclinical" types does not raise this proportion to more than 20 percent. It should be noted that table 3 presents the cases active in 1936 by leading classification. A complete tabulation would reveal hundreds of cases with double

TABLE 3.—*Active cases of mental disorder in the Baltimore survey*

[Population: 55,129]

Leading classification	Number of cases	Rate per 1,000	95 percent confidence limits
Psychosis	367	6.7	6.0- 7.3
Schizophrenia	158	2.9	2.4- 3.3
Manic-depressive	41	.7	.5- 1.0
Senile and arteriosclerotic	38	.7	.5- .9
Alcoholic	15	.3	.1- .4
Syphilitic	29	.5	.3- .7
With mental deficiency	28	.5	.3 .7
Other [1]	27	.5	.3- .7
Undiagnosed	31	.6	.4- .8
Psychoneurosis	171	3.1	2.6- 3.6
Psychopathic personality	30	.5	4- .7
Personality disorder in adults	218	4.0	3.4- 4.5
Psychotic traits	26	.5	.3- .7
Neurotic traits	60	1.1	.8- 1.4
Psychopathic traits	13	.2	.1- .4
Behavior deviation	119	2.2	1.8- 2.5
Behavior disorder in children	449	8.1	7.4- 8.9
Neurotic traits	162	2.9	2.5- 3.4
Conduct problems	287	5.2	4.6- 5.8
Minor and possible disorder in adults and children	651	11.8	10.9-12.7
Epilepsy	75	1.4	1.1- 1.7
Mental deficiency	375	6.8	6.1- 7.5
School progress problems without mental deficiency	434	7.9	7.1- 8.6
Adult delinquency without other information	567	10.3	9.4-11.1
Total active cases [2]	3,337	60.5	58.5-62.6

[1] Involutional, with epilepsy, post traumatic, and deliria not due to alcohol.
[2] Active+inactive cases: 3,416=62.0 per 1,000.

or multiple diagnosis, indicating a much more comprehensive analysis than was undertaken by Brugger and Strömgren. Some groups would expand spectacularly. The total number of epileptics, for instance, was 126 or 2.3 (1.9–2.7) per 1,000, that of mental defectives 694 or 12.6 (11.7–13.5) per 1,000 general population.

Table 4 summarizes the basic information about the active and inactive cases in the Tennessee survey. Again the full-fledged psychoses and psychoneuroses are very definitely in the minority. Mentally defective individuals not presenting a definite social or personal problem are listed as inactive here. The total number of mental defectives is 376 or 15.2 (13.6–16.7) per 1,000.

TABLE 4.—*Active and inactive cases of mental disorder in the Tennessee Survey*

[Population: 24,804]

Primary diagnosis	Number of cases			Rate per 1,000 (total cases)	95 percent confidence limits
	Active	Inactive	Total		
Psychosis	121	35	156	6.3	5.3– 7.3
Schizophrenia			43	1.7	1.2– 2.3
Affective			41	1.7	1.1– 2.2
Senile			23	.9	.5– 1.3
With mental deficiency			15	.6	.3– .9
Other [1]			24	1.0	.6– 1.4
Undiagnosed			10	.4	.2– .7
Psychoneurosis	89	10	99	4.0	3.2– 4.8
Conduct and behavior disorder	285	129	414	16.7	15.1–18.3
Psychopathic traits	152	34	186	7.5	6.4– 8.6
Special personality traits	208	127	335	13.5	12.1–15.0
Mental deficiency	19	184	203	8.2	7.1– 9.3
Organic and miscellaneous conditions	40	288	328	13.2	11.8–14.7
All types	914	807	1,721	69.4	66.1–72.7

[1] General paresis, other organic states, posttraumatic, with alcoholism, and with epilepsy.

Is there any legitimate possibility for comparison of findings between the five surveys reviewed in this paper? They were made by four different investigators (or groups of investigators) in three countries. The widely divergent methods and practices employed in each study for case finding and classification has been set forth in the preceding pages as well as the great variations in scope. Nevertheless there is a strong temptation to seek a basis for comparison. It is realized that such a comparison cannot be exact; that it cannot give more, in fact, than a very general idea nor be more than a very slim basis for generalizations. Apart from the inevitable sampling variation, the range of which is indicated in the tables, a difference of prevalence rates between two surveys may be due to differences in scope, in case finding, in diagnosis, or to actual variations in the true prevalence of the various types of mental disorder. At the present state of our knowledge no valid conclusions can yet be drawn from the differences between the observed prevalence rates. On the other hand if the rate is found reasonably near the same level in all surveys, then the suspicion seems justified that we may be on the track of a numerical relationship of wider applicability.

The prevalence rates computed from the total numbers of active and inactive cases included in each survey are 12.8 per 1,000 general population for Thuringia, 15.6 for Bornholm, 59.9 for Bavaria, 62.0 for Baltimore, and 69.4 for Tennessee. In view of what has been said before it is obvious that the marked differences are due mainly to variations in scope and that at least some of the apparent similarities of rates must be entirely coincidental.

A fairly good picture of the prevalence of the major forms of mental disorder may be obtained from a combination of the psychoses and psychoneuroses, covering what might be called the field of "clinical"

or "traditional" psychiatry. A clear-cut separation of the two groups is not feasible in the three European surveys. Likewise it is necessary to include both active and inactive cases as this distinction cannot be made in Brugger's papers. The aggregate prevalence rate is 6.4 (5.6–7.2) per 1,000 general population in Thuringia, 8.7 (6.7–10.7) in Bavaria, 10.3 (9.0–11.5) in Tennessee, 11.4 (10.5–12.4) in Bornholm, and 11.8 (10.9–12.7) in Baltimore.[3] It should be borne in mind, however, that the comparability is by no means absolute, all epileptics, for instance, being included in Thuringia, Bavaria, and Bornholm, but only epileptics with psychosis in the American surveys. Nevertheless the statement is probably not far off the mark that about 1 percent of the general population is or has been suffering from major mental disorder, that is from a psychosis or psychoneurosis. Among these persons there seem to be considerably more psychotics than psychoneurotics. Such would, of course, not be the case if all individuals with any "neurotic" manifestations were included.

Table 5 presents a synopsis of prevalence rates for two supposedly uniformly defined groups. Active and inactive cases are included in the figures for the two "endogenous" psychoses and it will also be

TABLE 5.—*Active and recovered cases of schizophrenia and manic-depressive psychosis in five surveys*

	Schizophrenia	Manic-depressive	Schizophrenia and manic-depressive
Number of cases:			
Thuringia	73	20	93
Bavaria	22	12	34
Bornholm	150	122	272
Baltimore [1]	193	62	255
Tennessee	43	41	84
Rate per 1,000:			
Thuringia	1.9	.5	2.5
Bavaria	2.5	1.4	3.9
Bornholm	3.3	2.7	5.9
Baltimore [1]	3.5	1.1	4.6
Tennessee	1.7	1.7	3.4
95 percent confidence limits:			
Thuringia	1.5–2.4	.3–.8	2.0–3.0
Bavaria	1.5–3.6	.6–2.2	2.6–5.3
Bornholm	2.8–3.8	2.2–3.1	5.2–6.6
Baltimore [1]	3.0–4.0	.8–1.4	4.1–5.2
Tennessee	1.2–2.2	1.1–2.2	2.6–4.1

[1] One-day estimate made on the basis of the known numbers of hospitalized and nonhospitalized patients and of postpsychotic individuals in each diagnostic group.

noted that the aggregate rates present a more regular pattern than the constituent parts. No other groups appear comparable throughout all five surveys. Unfortunately the numbers of cases underlying many of the rates in table 5 are quite small.

Turning now to attempts at estimating the *incidence* of mental disorder for sample populations we find a number of papers using a

[3] The Baltimore figure does not include inactive cases of psychoneurosis. In the Tennessee study there were only 10 such individuals, corresponding to a rate of 0.4 per 1,000. Figures in parentheses indicate 95 percent confidence limits. Apparent inconsistencies with the tables are due to multiple diagnoses.

method inaugurated by Professor Rüdin (*33*) of the German Research Institute for Psychiatry at the Kaiser Wilhelm Institute in Munich. Some of these studies were conducted and published under the auspices of the Institute; others were made independently but conform to the technique worked out there.

In each of them the procedure consists of three phases; first, construction of the sample population, second, case finding and diagnosis, and third, statistical analysis. The construction of the sample population starts with the selection of a group of propositi. These must meet a number of requirements which are often hard to reconcile. The group should be of adults and as large as can be handled, of average social-economic status, accessible to the psychiatrist but unbiased as far as disposition to mental disorder is concerned. Actually most of the groups of propositi studied number between 100 and 200 persons. They fall by type of origin into three classes; first, wives and husbands of patients with organic psychoses; second, medical and surgical patients themselves; and third, nonpatient material collected on a geographic or occupational basis.

The next step is to obtain a roster of all siblings of the propositi. In order to get complete information this must be done with great thoroughness and often the help of interested members in the family of the propositus is enlisted. Corroborative evidence is obtained from church and civil authorities, schools, etc. Psychiatric case finding is very closely connected with the genealogic work on the sample population. The informants are questioned about illnesses, commitments to mental institutions, outstanding personality traits, and other pertinent facts. Wherever possible the opinions of several observers about the same individual are checked against each other. The picture is rounded out by hospital records, physicians' statements, and other documents. Most of the authors have endeavored to see personally as many individuals in the families of the propositi and in particular as many of the mentally abnormal cases reported to them as feasible. In every study, however, some of the siblings are dead, some live in remote places, and a few are uncooperative. Therefore some of the psychiatric diagnoses must be made on the basis of descriptions by lay persons.

The German school has made conscious efforts to keep diagnostic practice and terminology as uniform as possible. Some groupings appear to be comparable to their counterparts in American psychiatry. This is true for schizophrenia, manic-depressive psychoses, general paresis, and idiopathic epilepsy. In some cases distinctions are somewhat unsatisfactory as, for instance, between senile dementia and cerebral arteriosclerosis and perhaps also between hysteria and psychopathic personality. The latter term apparently is used for a much wider range of conditions in Germany than in this country.

The greater number of the genealogic studies covers only institutionalized cases of psychopathic personality. Data on mental deficiency are likewise not directly comparable to American and English studies because our highly standardized testing procedures are not used and diagnoses are made on the basis of social history and clinical observation. The term "oligophrenia" covers idiots and imbeciles. For mental deficiency of a lesser degree the expression "debil" is used, but many of the papers do not attempt to report these cases. Of alcoholics, only such individuals are included who show evident moral, social, or economic decline or at least lack of progress which ordinarily would be expected (*24*). This criterion is applicable on all occupational and cultural levels.

Of prime importance for a successful estimate of the incidence of mental disorder from genealogical data is of course the cooperativeness of the propositi, their relatives, and other informants. It must be made clear to them why such information is sought; the disinclination to reveal abnormalities in the family has to be overcome and they must be convinced that the investigation will not lead to any discrimination against them. It is reported that after the enactment of the German sterilization laws people became quite reluctant to assist in genealogical studies of their own families (*4*, *6*). We have been unable to find any papers of the type described published after 1937. It may well be that the work had to be discontinued because it was felt that the results had become too unreliable.

The final step is the statistical analysis. Incidence is given in terms of expectancy, expectancy being defined as the chance of developing or acquiring a specific disease if the individual lives through the age period of susceptibility. It is obvious that a rate thus defined is significant for conditions that have their onset at birth, in youth, or middle life, but that it cannot be used for instance for senile dementia because here the period of susceptibility has no upper age limit. The German group responsible for the method was and probably still is chiefly interested in the heredity of mental disorder and has not paid much attention to the psychoses of advanced age.

The actual computations of expectancy are usually carried out for the major psychoses by the abridged method of Weinberg (*42*). This consists in putting into the numerator the number of cases and into the denominator the total number of siblings who have passed through the period of susceptibility plus one-half of those who have entered but not passed it. The age of susceptibility is assumed to be 16 to 40 years for schizophrenia, 20 to 50 years for manic-depressive psychosis, and 30 to 50 years for general paresis. For mental deficiency, epilepsy, and other forms of mental disorder the number of cases is as a rule simply related to the number of siblings who have passed their tenth

birthday. These approximations seem close enough for most purposes. More complicated formulae, though sometimes used, appear unjustified in view of the scanty basic data.

In general there has been a marked tendency on the part of the German workers to overestimate the statistical validity of their findings. As early as 1928 when only two studies had been published, Luxenburger wrote as follows: "The expectancy of dementia praecox, manic-depressive psychoses, epilepsy, and general paresis seems to be *practically established* for a predominantly urban average population (Munich): this expectancy is for dementia praecox 0.85 percent, for manic-depressive psychosis 0.41 percent, for epilepsy 0.29 and for general paresis 1.73 percent. The figures for dementia praecox and paresis in particular are stable enough to be considered as *standard rates*" (*24*). The italics are Luxenburger's. These rates were carried from one publication to the other and often uncritically accepted as more or less official. It is not generally known that these so-called standard rates are based on eight cases of paresis, five of schizophrenia, and two each of manic-depressive psychosis and epilepsy. In subsequent years when one paper after the other appeared in the Zeitschrift für die gesamte Neurologie und Psychiatrie the authors could not always resist the temptation to compare their individual findings with those of others. Practically all these comparisons are worthless because of the small numbers in each sample. From the scientific point of view, it would appear that a better way of utilizing the genealogical method would be to make as many studies as possible with the same technique and to combine them into one large series. Such compilations have been made from time to time in Germany at least for certain diagnostic groups (*12*, *17*, *37*, *38*).

Table 6 presents a synopsis based upon 15 papers published between 1927 and 1937. In four (*7*, *24*, *31*, *35*) the propositi are wives and husbands of patients with organic psychoses, in six (*2*, *3*, *5*, *6*, *36*, *43*) they are medical and surgical patients and in the remaining five (*1*, *4*, *9*, *19*, *25*) a nonpatient group has been used. Four (*5*, *24*, *35*, *36*) groups of propositi were investigated in Munich, four (*9*, *19*, *25*, *43*) in the rural part of Bavaria, two (*4*, *6*) in Silesia, one each in Berlin (*31*) and Saxony (*1*), and three in Switzerland (*2*, *3*, *7*). Northern Germany is definitely under-represented. The total number of propositi in the 15 studies is 2,090 and the total number of siblings 10,684. Table 6 presents in summary form the number of cases of mental disorder found among these siblings and the expectancies calculated from them. Weinberg's abridged method is used for schizophrenia, manic-depressive psychosis, and general paresis; all other forms of illness are related to persons over 10 years of age, except alcoholism where those over 20 are used as a population base. The confidence limits indicate that the sample is not as numerically adequate as one

would like to have it, apart from the question of representativeness. The almost complete absence of senile dementia and cerebral arteriosclerosis—one case of either is included among the "other psychoses"—is of course due to the age distribution of the siblings. Only 15 percent of them are over 50 years of age and very few over 60.

TABLE 6.—*Mental disorder found among a total number of 10,684 siblings of 2,090 propositi in 15 papers from Germany and Switzerland*

	Bibliography No.															Total	Rate per 1,000	95 percent confidance limits
	1	2	3	4	5	6	7	9	19	24	25	31	35	36	43			
Schizophrenia	7	6	2	3	4	1	6	3	--	3	2	1	2	2	----	42	7.7	5.4–10.1
Manic-depressive	3	1	--	1	-	1	--	1	--	1		1	1	--	----	10	2.3	.9–3.8
General paresis	2	--	-	-	1	-	-		--	4	1	--	4		--	12	3.5	1.5–5.5
Epilepsy	6	4	3	3	1	2	1	1	2	1	3	3	1	2	1	33	4.2	2.8–5.7
Hysteria	6	5	--	---	-	-	---	-	2	1	2	--	----	----	1	17	2.2	1.1–3.2
Other psychoses	---	---	---	---	1	1	---	2	----	--	--	----	3	----	----	7	.9	.2–1.6
Undiagnosed psychoses	---		--	1	1	-	1	1	--	2	---		--	1	--	7	.9	.2–1.6
Oligophrenia	9	14	5	12	6	6	3	6	5	1	1	2	2	2	2	76	9.7	7.5–11.9
Morons ("debil")	([1])	([1])	([1])	([1])	([1])	([1])	7	3	6	([1])	3	13	([1])	2	13	[1]47	15.5	11.0–19.9
Psychopathic personalities:																		
Institutionalized	---	---	---	3	3	2	2	---	----	----	----	2	1	3	----	16	2.0	1.0–3.0
Not institutionalized	34	2	([1])	12	([1])	2	5	([1])	([1])	([1])	([1])	26	([1])	4	([1])	[1]85	18.8	14.8–22.8
Alcoholism	1	20	6	---	4	---	4	2	5	5	3	1	6	3	----	60	8.6	6.4–10.8

[1] Morons ("debil") and psychopathic personalities, not institutionalized, are included in only 7 papers each.

Luxenburger was quite lucky in the case of schizophrenia with his original "standard rate" of 0.85 percent based on five cases, but he was less successful concerning manic-depressive psychosis and epilepsy and quite off the mark in general paresis.

The combined incidence for all forms of psychosis and psychoneurosis—excluding the disorders of advanced age but including epilepsy—appears to be about 20 per 1,000 individuals living through the age period of susceptibility. This is reasonably compatible with the figures on prevalence previously presented.

Outside Germany and Switzerland, the genealogic method has been used by Eliot Slater (*39*) in England, who used a group of surgical patients as propositi and considers his results as most unsatisfactory, and by Strömgren (*40*) in his investigation of Bornholm. Strömgren's findings based on a material of 427 propositi with 1,927 siblings are in line with the German figures, but the number of cases is of course quite small. No such studies have been made in the United States. Any undertaking of this type would be beset with great difficulties in a country where general registration of population is not practiced.

The expectancies based on genealogic studies conducted in Germany and Switzerland may be compared with estimates for New York State based on first admissions to mental hospitals (*41*). This com-

parison seems justified for schizophrenia, manic-depressive psychosis, and general paresis. Using a suitable life table the German figures can be converted to incidence rates in terms of persons born rather than of persons surviving the period of susceptibility. The reduction is carried out in table 7. The German rates are consistently much lower than the rates for New York State. This may be entirely due to incomplete case finding in the genealogical material but it is also possible that the incidence of the three psychoses is actually higher in New York. Several considerations point in this direction. Almost two-thirds of the population of New York State live in the metropolitan area of the largest city of the world; only five percent live on farms. The groups from which the German samples are drawn are much less urbanized and most psychoses seem to be more common in urban than in rural areas. It is also likely that the presence of three million foreign-born tends to elevate the incidence rate for New York. There is evidence that psychoses occur more often among migrants—both interstate and intercontinental—than in nonmigrant populations (*26, 29, 30*). On the other hand it must not be forgotten that the estimates for New York are based upon first admissions and do not include cases who at no time receive intramural care. This limitation does not apply to the genealogic sample studies.

TABLE 7.—*Expectancy per 1,000 born for three major psychoses in Germany and New York State*

	Germany	New York
Schizophrenia	6.8	10.0
Manic-depressive	2.0	5.0
General paresis	2.9	4.4

In summary, then, it appears that poor selection of sample populations and insufficient numbers of cases as well as differences in investigative methods, differences in fundamental concepts, and differences in diagnosis and classification tend to make the available studies of prevalence and incidence of mental disorder basically incomparable. In this sense the result of this "survey of surveys" is disappointing. At the same time it furnishes a challenge to continue investigation and to make effort to correct the shortcomings of the science in which we work.

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DEATHS DURING WEEK ENDED DECEMBER 18, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 18, 1943	Corresponding week, 1942
Data from 88 large cities of the United States:		
Total deaths	11,379	9,449
Average for 3 prior years	8,927	
Total deaths, 50 weeks of year	451,285	419,868
Deaths under 1 year of age	657	672
Average for 3 prior years	570	
Deaths under 1 year of age, 50 weeks of year	32,064	29,140
Data from industrial insurance companies:		
Policies in force	66,117,272	65,272,092
Number of death claims	12,220	12,006
Death claims per 1,000 policies in force, annual rate	9.6	9.6
Death claims per 1,000 policies, 50 weeks of year, annual rate	9.6	9.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORT FROM STATES FOR WEEK ENDED DECEMBER 25, 1943

Summary

A total of 83,973 cases of influenza was reported for the week, as compared with 82,951 for the preceding week. However, omitting Kentucky, which reported 34,148 cases for the week ended December 18, stated to be based on estimates in some localities, the figures for reported cases for the 2 weeks are 48,803 and 81,753, respectively. These figures probably provide a more nearly accurate index to the trend. In 44 States (excluding Kentucky and 3 New England States which reported no cases) increases were recorded currently in 32 States, decreases in 11 States, and the same number reported in 1 State. Reported cases for these States for weeks ended November 27, and December 4, 11, 18, and 25 are as follows: 2,464, 4,486, 18,330, 48,801 ,and 81,753. For the corresponding weeks of 1940 the figures for all States reporting were as follows: 1,332, 3,014, 9,663, 29,864, and 42,457. In the mild epidemic of that season, the peak was reached during the week ended January 18, 1941, with 107,270 reported cases.

An index to the corresponding increase in mortality is given by the following figures:

	Week ended—				
	Nov. 27	Dec. 4	Dec. 11	Dec. 18	Dec. 25
Deaths from influenza and pneumonia in 39 scattered cities:					
1943	254	381	459	832	1,063
1942	299	294	332	378	387
3-year average	284	292	304	334	338
Total deaths in 90 large cities	8,677	9,846	10,373	11,524	12,646
Percentage increase	−3.3	13.5	5.4	11.1	9.7

For the current week, the number of cases of poliomyelitis declined from 89 to 39. The 5-year median is 48. This is the first week since April that the incidence has been below the median.

A total of 361 cases of meningococcus meningitis was reported, as compared with 281 last week and a 5-year (1938–42) median of 34. The incidence increased in all of the nine geographic areas except the South Atlantic and Mountain. A total of 2,932 cases has been reported since the beginning of the fourth quarter of the year, as compared with 916 for the same period last year, the highest comparable incidence of the past 6 years. A total of 17,459 cases has been reported to date this year.

A total of 475 cases of dysentery (amebic, bacillary, and unspecified) was reported. Cumulative totals for 51 weeks of the year and for the past 12 weeks, respectively (comparable figures for last year in parentheses), are 24,396 (19,467) and 5,650 (3,506).

New low rates will apparently be established this year for both smallpox and typhoid fever. To date, 730 cases of smallpox and 5,418 cases of typhoid fever have been reported, as compared with 801 and 6,652 cases, respectively, last year, in which year both diseases established new low incidence rates.

A total of 4,475 cases of endemic typhus fever has been reported to date, as compared with 3,662 for the same period last year, the year of highest reported incidence.

The total deaths, all causes, in 90 large cities in the United States up to and including the week ended December 25 is 469,290, as compared with 433,740 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended December 25, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria: Week ended— Dec. 25, 1943	Diphtheria: Week ended— Dec. 26, 1942	Diphtheria: Median 1938–42	Influenza: Week ended— Dec. 25, 1943	Influenza: Week ended— Dec. 26, 1942	Influenza: Median 1938–42	Measles: Week ended— Dec. 25, 1943	Measles: Week ended— Dec. 26, 1942	Measles: Median 1938–42	Meningitis, meningococcus: Week ended— Dec. 25, 1943	Meningitis, meningococcus: Week ended— Dec. 26, 1942	Meningitis, meningococcus: Median 1938–42
NEW ENGLAND												
Maine	1	1	1	62	1	1	91	13	37	4	5	1
New Hampshire	0	1	0	(1)	------	------	2	14	4	1	0	0
Vermont	0	0	0	------	------	------	1	159	25	1	0	0
Massachusetts	7	4	4	------	------	------	340	352	196	17	6	2
Rhode Island	0	0	0	35	------	------	86	1	1	6	0	0
Connecticut	1	1	0	832	2	2	6	211	67	7	2	0
MIDDLE ATLANTIC												
New York	14	19	20	[2] 475	[2] 10	[2] 14	653	243	395	43	6	3
New Jersey	6	6	7	351	12	8	473	38	38	24	4	0
Pennsylvania	10	7	17	63	3	------	455	909	678	34	6	5
E. NO. CENTRAL												
Ohio	13	8	16	6,986	7	8	1,294	46	42	12	1	1
Indiana	7	8	8	677	9	14	85	75	11	22	8	0
Illinois	4	8	27	437	7	14	147	46	46	28	0	0
Michigan [3]	6	11	8	304	1	2	539	45	206	15	1	0
Wisconsin	8	3	0	1,832	31	31	455	164	164	12	3	0
W. NO. CENTRAL												
Minnesota	7	2	2	16	1	2	442	2	31	2	1	0
Iowa	2	1	3	11,463	------	3	33	64	69	1	0	0
Missouri	0	4	10	100	3	5	35	6	6	24	1	1
North Dakota	3	2	2	1,443	24	24	230	0	12	2	0	0
South Dakota	3	0	4	39	------	------	9	147	7	0	0	0
Nebraska	1	3	2	51	5	1	3	87	8	0	0	0
Kansas	5	8	5	975	7	15	25	25	70	5	1	1
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	12	0	1	0	0	0
Maryland [3]	3	8	8	696	11	8	36	3	3	10	8	0
District of Columbia	0	0	1	845	3	3	25	0	3	2	1	1
Virginia	5	12	14	7,584	383	152	93	12	41	6	10	0
West Virginia	3	4	9	3,747	16	18	83	6	6	1	3	8
North Carolina	9	4	38	76	2	10	96	3	145	1	2	1
South Carolina	7	3	4	1,958	204	315	41	3	3	1	1	1
Georgia	5	6	10	1,405	71	71	68	13	18	4	2	0
Florida	8	0	4	114	1	9	10	1	2	5	0	1
E. SO. CENTRAL												
Kentucky	3	3	5	[5] 2,220	18	18	9	58	12	7	0	0
Tennessee	7	6	11	982	56	52	51	13	29	5	0	1
Alabama	9	15	15	1,573	143	143	56	1	20	5	1	1
Mississippi [3]	0	5	5	------	------	------	------	------	------	2	0	1
W. SO. CENTRAL												
Arkansas	16	6	7	4,090	41	97	35	58	28	0	0	0
Louisiana	10	9	9	148	9	9	2	44	11	6	1	1
Oklahoma	2	8	8	2,022	94	97	9	103	11	4	0	0
Texas	20	21	47	9,392	823	823	59	16	35	4	2	2
MOUNTAIN												
Montana	0	0	0	2,654	15	15	126	26	26	4	0	0
Idaho	0	4	2	12	1	1	0	60	3	0	0	0
Wyoming	2	0	1	814	66	15	12	10	10	0	0	0
Colorado	8	8	11	1,041	34	36	116	27	27	0	3	3
New Mexico	0	0	1	28	3	2	4	3	10	1	0	0
Arizona	3	0	2	731	83	126	8	1	3	0	0	0
Utah [3]	0	0	0	5,723	43	43	10	261	19	1	1	0
Nevada	0	0	0	908	------	------	0	5	0	0	0	0
PACIFIC												
Washington	2	0	1	3,200	4	3	18	311	182	5	1	1
Oregon	2	2	2	2,201	13	13	62	289	37	3	11	0
California	12	20	20	3,668	30	102	87	44	190	24	0	0
Total	234	241	424	83,973	2,200	2,693	6,532	4,018	4,544	361	92	34
51 weeks	13,489	15,236	16,569	293,567	105,727	182,255	594,435	500,085	500,085	17,459	3,587	1,936

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 25, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Dec. 25, 1943	Dec. 26, 1942		Dec. 25, 1943	Dec. 26, 1942		Dec. 25, 1943	Dec. 26, 1942		Dec. 25, 1943	Dec. 26, 1942	
NEW ENGLAND												
Maine	0	0	0	22	8	16	0	0	0	1	0	1
New Hampshire	0	0	0	2	15	9	0	0	0	0	0	0
Vermont	0	0	0	4	1	7	0	0	0	0	0	0
Massachusetts	3	0	0	210	238	145	0	0	0	0	1	1
Rhode Island	0	0	0	9	3	3	0	0	0	0	0	0
Connecticut	0	0	0	30	28	33	0	0	0	2	0	0
MIDDLE ATLANTIC												
New York	1	4	1	265	279	297	0	0	0	1	3	6
New Jersey	0	0	0	79	47	92	0	0	0	2	0	0
Pennsylvania	1	0	1	163	157	245	0	14	0	0	0	7
EAST NORTH CENTRAL												
Ohio	1	0	1	220	243	243	0	13	1	1	0	3
Indiana	0	0	0	76	68	84	0	6	5	1	3	1
Illinois	2	0	1	136	168	323	3	1	1	0	4	4
Michigan [3]	0	0	0	86	95	182	0	0	1	4	0	2
Wisconsin	0	0	1	141	204	153	0	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota	0	1	1	96	56	76	0	0	15	0	3	0
Iowa	0	1	1	97	46	70	0	0	2	0	0	1
Missouri	0	0	0	46	66	79	0	0	2	0	5	4
North Dakota	0	1	0	6	14	13	0	0	0	1	0	0
South Dakota	0	0	0	19	23	17	0	2	2	0	0	0
Nebraska	0	0	0	36	20	20	0	0	1	0	0	0
Kansas	0	0	0	60	46	85	0	0	0	0	2	0
SOUTH ATLANTIC												
Delaware	0	0	0	3	2	18	0	0	0	1	0	0
Maryland [3]	0	1	1	47	40	40	0	0	0	1	1	2
District of Columbia	0	0	0	16	12	10	0	0	0	0	0	1
Virginia	0	1	1	40	45	31	0	0	0	1	3	3
West Virginia	0	0	1	38	37	67	0	0	0	0	0	1
North Carolina	1	0	0	36	39	68	0	0	0	0	0	0
South Carolina	0	0	0	5	11	10	0	0	0	0	2	1
Georgia	0	0	0	13	35	23	0	0	0	0	0	6
Florida	0	0	0	6	5	8	1	0	0	4	0	0
EAST SOUTH CENTRAL												
Kentucky	0	1	0	43	22	59	0	1	0	4	1	2
Tennessee	0	2	0	38	58	58	0	0	0	1	1	2
Alabama	0	0	1	13	22	25	1	0	0	0	3	2
Mississippi [3]	0	2	0	10	2	8	0	0	0	0	1	1
WEST SOUTH CENTRAL												
Arkansas	0	1	1	4	4	12	0	0	0	0	1	3
Louisiana	1	0	1	6	4	11	0	0	0	3	4	4
Oklahoma	1	0	0	30	27	24	0	0	2	5	1	1
Texas	1	7	3	36	39	48	1	0	2	3	4	7
MOUNTAIN												
Montana	0	0	0	39	8	30	0	0	0	0	0	0
Idaho	0	1	0	7	4	7	0	0	0	0	0	0
Wyoming	0	0	0	4	46	11	0	0	0	0	0	0
Colorado	0	1	0	35	58	29	0	0	1	0	1	0
New Mexico	0	0	0	2	2	7	0	0	0	1	2	3
Arizona	1	2	0	5	0	4	0	0	0	0	2	1
Utah [3]	6	0	0	82	54	13	0	0	0	0	0	6
Nevada	2	0	0	2	3	0	0	0	0	0	0	0
PACIFIC												
Washington	2	0	0	74	9	44	0	0	0	2	0	0
Oregon	6	0	0	79	11	11	0	0	0	2	0	6
California	10	10	3	196	103	107	0	0	0	1	1	3
Total	39	36	48	2,712	2,527	2,979	6	37	47	42	49	[illegible]
51 weeks	12,358	4,143	7,261	137,454	123,995	152,425	730	801	2,401	5,418	6,652	9,505

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 25, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended Dec. 25, 1943								
	Week ended—		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Dec. 25, 1943	Dec. 26, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	6	39	19	0	0	0	0	0	0	0	0	0
New Hampshire	0	5	7	0	0	0	0	0	0	0	0	0
Vermont	10	42	35	0	0	0	0	0	0	0	0	0
Massachusetts	54	194	194	0	0	4	0	2	0	0	0	0
Rhode Island	7	26	26	0	0	0	0	0	0	0	0	0
Connecticut	12	29	54	0	0	2	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	125	321	410	0	2	3	0	4	1	0	0	0
New Jersey	61	130	162	0	3	0	0	1	0	0	1	0
Pennsylvania	66	253	253	0	0	0	0	0	0	0	0	0
E. NO. CENTRAL												
Ohio	38	133	133	0	0	0	0	0	0	0	2	0
Indiana	23	24	17	0	0	0	0	0	0	0	1	0
Illinois	54	89	171	0	4	3	0	0	0	0	3	0
Michigan [3]	75	191	203	0	0	1	0	1	0	0	0	0
Wisconsin	94	142	142	0	0	0	0	0	0	0	0	0
W. NO. CENTRAL												
Minnesota	12	30	42	0	4	0	0	0	0	0	0	0
Iowa	18	28	22	0	0	0	0	0	0	0	0	0
Missouri	4	11	20	0	0	0	0	0	0	0	0	0
North Dakota	31	7	4	0	0	0	0	0	0	0	0	0
South Dakota	0	1	2	0	0	0	0	0	0	0	0	0
Nebraska	3	1	2	0	0	0	0	0	0	0	0	0
Kansas	15	46	39	0	0	1	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	2	7	4	0	0	0	0	0	0	0	0	0
Maryland [3]	28	69	49	0	0	0	1	0	0	0	3	0
District of Columbia	3	9	13	0	0	0	0	0	0	0	0	0
Virginia	60	59	59	0	0	0	27	0	0	0	2	0
West Virginia	13	4	15	0	0	0	0	0	0	0	0	0
North Carolina	48	26	85	0	0	0	0	0	0	0	0	3
South Carolina	41	4	19	0	0	3	0	0	0	0	0	1
Georgia	0	13	10	0	0	3	0	0	0	0	0	16
Florida	20	5	5	0	0	5	0	0	0	0	0	9
E. SO. CENTRAL												
Kentucky	47	19	24	0	0	1	0	0	0	0	2	0
Tennessee	19	16	19	0	1	0	0	0	0	0	0	0
Alabama	12	43	36	0	0	0	0	0	0	1	0	12
Mississippi [3]	------	------	------	0	0	0	0	0	0	0	0	2
W. SO. CENTRAL												
Arkansas	22	26	26	0	0	1	0	0	0	0	0	1
Louisiana	1	0	5	0	0	0	0	0	0	0	0	4
Oklahoma	0	15	5	0	0	0	0	0	0	0	0	0
Texas	151	128	121	0	10	375	0	0	0	0	0	34
MOUNTAIN												
Montana	6	17	6	0	0	0	0	1	0	0	0	0
Idaho	1	1	4	0	0	0	0	0	0	0	0	0
Wyoming	0	6	3	0	0	0	0	1	0	0	0	0
Colorado	22	6	32	0	0	0	0	0	0	0	0	0
New Mexico	8	9	15	0	0	0	0	0	0	0	0	0
Arizona	20	0	10	0	0	0	14	0	0	0	1	0
Utah [3]	8	14	18	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	20	16	16	0	0	0	1	0	0	0	0	0
Oregon	18	9	12	0	0	0	0	0	0	0	0	0
California	42	192	137	0	2	4	0	1	0	0	0	0
Total	1,320	2,455	3,176	0	26	406	43	11	1	1	15	82
51 weeks	175,128	175,284	175,284	65	2,104	17,968	4,324	680	30	436	780	4,475
51 weeks, 1942	------	------	------	78	1,160	11,953	6,354	552	45	452	879	3,662

[1] Upper respiratory infections, 21.
[2] New York City only.
[3] Period ended earlier than Saturday.
[4] Including paratyphoid fever cases reported separately as follows: Michigan, 1; New York, 1; Florida 2.
[5] Later reports for Kentucky reveal that an estimated 30,000 of the more than 35,000 cases occurring in the week ended Dec. 11 (Public Health Reports, Dec. 24, 1943, p. 1901, footnote 3) were included in the telegraphic report for the week ended Dec. 18.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 11, 1943

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	11	0	2	0	7	0	0	4
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	1	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	4	0	------	0	14	10	18	1	53	0	0	25
Fall River	0	0	------	0	1	0	0	1	3	0	0	0
Springfield	0	0	------	0	17	2	3	0	7	0	0	2
Worcester	0	0	------	0	1	0	9	0	61	0	0	7
Rhode Island:												
Providence	0	0	1	0	65	3	4	0	3	0	0	19
Connecticut:												
Bridgeport	0	0	1	1	0	1	4	0	4	0	0	0
Hartford	0	0	1	0	0	1	1	0	9	0	0	2
New Haven	0	0	1	0	2	1	2	0	2	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	2	3	3	11	1	9	0	0	2
New York	13	1	70	5	444	20	89	7	185	0	4	59
Rochester	1	0	------	2	0	2	26	0	5	0	0	10
Syracuse	0	0	------	0	0	0	3	0	3	0	0	12
New Jersey:												
Camden	2	0	1	1	0	1	3	0	3	0	0	1
Newark	0	0	12	0	1	3	8	0	9	0	0	11
Trenton	0	0	1	0	2	0	3	0	11	0	0	3
Pennsylvania:												
Philadelphia	2	0	13	5	5	15	44	0	41	0	1	12
Pittsburgh	1	0	9	5	155	1	23	0	20	0	2	6
Reading	0	0	------	0	1	0	3	0	1	0	0	5
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	3	0	2	2	5	0	5	0	23	0	0	2
Cleveland	0	0	7	1	48	4	6	0	47	0	2	13
Columbus	0	0	1	1	18	0	3	0	12	0	0	1
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	2	0	0	0
Indianapolis	6	0	------	3	2	2	18	0	18	0	0	4
South Bend	0	0	------	0	48	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	0	0	3	0	0	0	0	0
Illinois:												
Chicago	2	0	120	8	8	13	42	4	67	0	1	33
Springfield	0	0	17	0	2	0	7	0	1	0	0	0
Michigan:												
Detroit	3	0	44	0	13	11	19	0	52	0	3	21
Flint	0	0	------	0	9	0	8	0	4	0	0	15
Grand Rapids	0	0	------	0	51	0	2	0	6	0	0	2
Wisconsin:												
Kenosha	0	0	------	0	1	0	0	0	5	0	0	1
Milwaukee	1	0	4	4	7	4	12	0	43	0	0	29
Racine	0	0	------	0	1	0	2	0	5	0	0	9
Superior	0	0	------	0	121	1	2	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	5	0	2	0	13	0	0	16
Minneapolis	7	0	------	2	56	2	5	0	50	0	0	5
Missouri:												
Kansas City	2	0	38	0	1	2	5	0	18	0	1	1
St. Joseph	0	0	------	0	0	0	0	0	3	0	0	0
St. Louis	0	0	40	0	5	6	12	1	14	0	0	14

City reports for week ended Dec. 11, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	15	0	0	0	2	0	0	0
Nebraska:												
Omaha	2	0	------	0	1	0	2	0	15	0	0	0
Kansas:												
Topeka	1	0	------	0	1	0	0	0	4	0	0	6
Wichita	0	0	5	2	0	1	9	0	8	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	2	0	9	0	4	0	0	0
Maryland:												
Baltimore	1	0	32	3	14	3	25	0	30	0	0	23
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	3	0	45	4	28	1	17	0	23	0	0	6
Virginia:												
Lynchburg	0	0	------	0	242	0	1	0	1	0	0	2
Richmond	0	0	13	1	10	3	1	0	1	0	0	3
Roanoke	0	0	------	0	1	0	0	0	1	0	0	2
West Virginia:												
Charleston	0	0	------	0	5	0	0	0	0	0	0	0
Wheeling	0	0	------	0	0	0	3	0	2	0	0	2
North Carolina:												
Raleigh	0	0	------	0	0	0	0	0	0	0	0	0
Winston-Salem	0	0	------	0	65	0	0	0	3	0	0	0
South Carolina:												
Charleston	0	0	32	1	1	2	2	0	2	0	0	0
Georgia:												
Atlanta	0	0	96	0	4	1	6	1	2	0	0	1
Brunswick	0	0	------	0	16	0	3	0	0	0	0	0
Savannah	0	0	4	0	0	1	1	0	1	0	0	0
Florida:												
Tampa	0	0	------	0	0	0	3	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	44	3	1	2	8	0	6	0	0	2
Nashville	0	0	------	0	0	0	5	0	6	0	0	4
Alabama:												
Birmingham	1	0	17	1	4	0	1	0	0	0	0	0
Mobile	0	0	------	4	0	1	5	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	1	0	3	0	0	0	0	0
Louisiana:												
New Orleans	4	0	18	5	3	0	11	1	2	0	0	0
Shreveport	0	0	------	0	0	0	2	0	2	0	0	0
Texas:												
Dallas	0	0	1	1	0	1	4	1	1	0	0	6
Galveston	0	0	------	0	0	0	0	0	0	0	0	0
Houston	4	0	------	1	1	2	7	0	2	0	0	0
San Antonio	0	0	1	0	0	0	3	0	0	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	1	0	0	0	0	0
Great Falls	0	0	------	0	47	1	0	0	3	0	0	0
Helena	0	0	------	0	0	0	0	0	5	0	0	0
Missoula	0	0	------	0	0	0	3	0	1	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	1	0	1	0
Colorado:												
Denver	0	0	55	2	11	0	10	0	13	0	0	12
Pueblo	0	0	------	0	130	0	2	0	1	0	0	11
Utah:												
Salt Lake City	0	0	------	1	4	1	1	1	22	0	0	1

City reports for week ended Dec. 11, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	2	0	------	1	4	1	4	0	4	0	0	6
Spokane	0	0	1	1	22	0	1	0	22	0	0	4
Takoma	2	0	-----	0	3	0	0	0	11	0	0	3
California:												
Los Angeles	4	0	44	2	5	2	3	2	37	0	0	9
Sacramento	0	0	------	0	3	1	1	1	2	0	0	0
San Francisco	0	0	1	0	2	4	13	3	12	0	0	2
Total	71	1	792	75	1,769	136	580	25	1,072	0	15	452
Corresponding week, 1942	87	0	152	53	1,073	85	410	11	817	0	8	1,048
Average, 1938–42	104	------	663	[1] 84	[2] 982	------	[1] 401	------	877	6	21	1,137

Dysentery, amebic.—Cases New York, 1; Philadelphia, 1; Detroit, 2; Los Angeles, 1; San Francisco, 1.
Dysentery, bacillary.—Cases: Bridgeport, 1; New York, 5; Rochester, 1; Syracuse, 1; Detroit, 8; Charleston, S. C., 4; Los Angeles, 8.
Dysentery, unspecified.—Cases: San Antonio, 6.
Leprosy.—Cases: Los Angeles, 1.
Tularemia.—Cases: Reading, 1; Chicago, 1.
Typhus fever.—Cases: Winston-Salem, 1; Atlanta, 1; Brunswick, 1; Savannah, 3; Little Rock, 1; New Orleans, 1; Houston, 1; San Antonio, 15 (10 delayed reports are included); Los Angeles, 2.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population, 1942, 34,443,000)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	9.9	0.0	9.9	2.5	276	44.7	106.8	5.0	373	0.0	0.0	149
Middle Atlantic	8.5	0.4	47.3	8.9	272	20.1	95.0	3.6	128	0.0	3.1	54
East North Central	8.8	0.0	113.9	11.1	195	20.4	75.9	2.3	166	0.0	3.5	76
West North Central	26.2	0.0	181.5	8.7	184	24.1	76.5	2.2	278	0.0	2.2	92
South Atlantic	6.8	0.0	379.4	15.4	663	18.8	121.3	1.7	120	0.0	0.0	67
East South Central	5.9	0.0	362.3	47.5	30	17.8	112.9	0.0	71	0.0	0.0	36
West South Central	23.5	0.0	58.7	20.5	15	8.8	88.0	5.9	21	0.0	0.0	18
Mountain	0.0	0.0	442.2	24.1	1,544	16.1	136.7	8.0	370	0.0	8.0	193
Pacific	14.0	0.0	80.4	7.0	68	14.0	38.4	10.5	154	0.0	0.0	42
Total	10.7	0.2	119.9	11.4	268	20.6	87.8	3.8	162	0.0	2.3	68

TERRITORIES AND POSSESSIONS

Hawaii Territory

Honolulu—Dengue fever.—During the week ended December 11, 1943, 34 new cases of dengue fever were reported in Honolulu, T. H., bringing the total number of cases reported to date to 1,284.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended November 27, 1943.—During the week ended November 27, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		22		317	575	98	88	123	125	1,348
Diphtheria		13	3	64	1	4	3		7	95
Dysentery (amebic)					1				2	3
Dysentery (bacillary)				2						2
Encephalitis, infectious									1	1
German measles		1		3	16				9	29
Influenza	3	21	4		181	5			30	244
Measles		1		206	249	12	3	40	10	521
Meningitis, meningococcus			1		2	1				4
Mumps		7	2	76	196	36		27	88	432
Poliomyelitis					1	1				2
Scarlet fever		7	11	94	151	42	11	41	39	396
Tuberculosis (all forms)		6	2	70	59	6		29	41	213
Typhoid and paratyphoid fever				16	3				2	21
Undulant fever					5					5
Whooping cough		2		99	99	16	16	11	40	283

SWEDEN

Notifiable diseases—October 1943.—During the month of October 1943, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	8	Poliomyelitis	396
Diphtheria	177	Scarlet fever	3,064
Dysentery	152	Syphilis	114
Encephalitis, epidemic	4	Typhoid fever	4
Gonorrhea	2,023	Undulant fever	7
Hepatitis, epidemic	1,001	Weil's disease	9
Paratyphoid fever	16		

SWITZERLAND

Notifiable diseases—April–June 1943.—During the months of April, May, and June 1943, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	April	May	June
Cerebrospinal meningitis	11	4	7
Chickenpox	168	160	318
Diphtheria and croup	136	117	199
Dysentery	7	11	272
German measles	32	6	33
Hepatitis, epidemic	164	272	671
Influenza	8	8	35
Lethargic encephalitis	----------	----------	2
Malaria	1	----------	----------
Measles	309	435	964
Mumps	172	158	158
Paratyphoid fever	3	9	20
Poliomyelitis	5	6	15
Scarlet fever	133	166	213
Trachoma	1	1	----------
Tuberculosis	402	404	483
Typhoid fever	2	6	11
Undulant fever	20	23	20
Whooping cough	141	253	673

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–September 1943	October 1943	November 1943—week ended— 6	13	20	27
ASIA							
Ceylon	C	50	-------	-------	-------	-------	-------
China: Kwangsi Province	C	[1] 1,100	-------	-------	-------	-------	-------
India	C	210,136	32,897	-------	-------	-------	-------
Bombay	C	16	12	-------	-------	-------	-------
Calcutta	C	5,028	1,307	100	67	83	-------
Chittagong	C	245	37	36	34	-------	-------
Cochin	C	192	-------	-------	-------	-------	-------
Madras	C	1,003	58	6	8	-------	-------
Negapatam	C	21	-------	-------	-------	-------	-------
Vizagapatam	C	63	-------	-------	-------	-------	-------
India (French)	C	55	-------	-------	-------	-------	-------
Chandernagor	C	8	-------	-------	-------	-------	-------
Karikal	C	30	-------	-------	-------	-------	-------
Pondichery	C	17	-------	-------	-------	-------	-------

[1] Cases reported up to Sept. 8, 1943, with a mortality rate of over 25 percent.

PLAGUE

[C indicates cases; D, deaths; P, present]

AFRICA							
Basutoland	C	[1] 23	-------	-------	-------	-------	-------
Belgian Congo	D	-------	[2] 17	-------	-------	-------	-------
Plague-infected rats		P	-------	-------	-------	-------	-------
British East Africa:							
Kenya	C	17	-------	-------	-------	-------	-------
Uganda	C	18	-------	-------	-------	-------	-------
Egypt [3]	C	14	1	-------	3	12	-------
Port Said	C	6	1	-------	-------	-------	-------
Madagascar	C	53	-------	-------	-------	-------	-------
Morocco (French)	C	241	1	-------	4	-------	-------
Senegal	C	244	-------	-------	-------	-------	-------
Dakar	C	32	-------	-------	-------	-------	-------
Union of South Africa	C	65	1	2	-------	-------	-------

See footnotes at end of table.

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January-September 1943	October 1943	November 1943—week ended—			
				6	13	20	27
ASIA							
India	C	3,414	1,539				
Indochina	C	30	1				
Palestine	C	12					
EUROPE							
Portugal (Azores).[4]							
SOUTH AMERICA							
Ecuador: Loja Province	C		2				
Peru:							
Lambayeque Department	C	2					
Libertad Department	C	16					
Lima Department	C	11					
Lima	C	1					
Plague-infected rats		P					
Piura Department	C	2					
Venezuela	C	10					
OCEANIA							
Hawaii Territory:							
Hamakua District	D	5					
Plague-infected rats		[5] 74	1	1			

[1] Includes 12 pneumonic cases in a village south of Mafeteng.
[2] Includes 7 suspected pneumonic plague deaths.
[3] A cablegram dated Dec. 13, 1943, states that 52 cases of plague have been reported to date in Egyp including 47 cases at Suez, 4 at Port Tewfik, and 1 at Bitter Lake. For the week ended Dec. 18, 1 case wa reported at Cairo, 2 at Port Said, 1 at El Bala, and 1 at Geneifa.
[4] A report dated Nov. 19, 1943, states that during 1942 there were 54 cases of plague including 3 pneumor cases and 2 septicemic cases among the civil population and 2 additional cases among the military pop tion of the Azores. In 1943 the number of cases is about the same as for the year 1942.
[5] Includes 4 plague-infected mice.

SMALLPOX

[C indicates cases; D, deaths]

Place		January-September 1943	October 1943	November 1943—week ended— 6	13	20	27
AFRICA							
Algeria	C	1,087	97				
Angola	C	613					
Basutoland	C	81					
Belgian Congo	C	2,975	435				
British East Africa:							
Kenya	C	1,488	448	120	145		
Mombasa	C	3					
Tanganyika	C	27	33	1			
Uganda	C		49	2	5		
Dahomey	C	141					
Egypt	C	2,848	456	67	44	61	
French Guinea	C	336	35				
Gold Coast	C	17	4				
Ivory Coast	C	144	10				
Mauritania	C	27	13				
Morocco (French)	C	848					
Mozambique	C	1					
Nigeria	C	4,660	407	106	96	58	
Niger Territory	C	221	42				
Senegal	C	74					
Sierra Leone	C	3					
Sudan (French)	C	3,440	156				
Tunisia	C	3					
Union of South Africa	C	439	2				
ASIA							
Arabia	C	1					
Ceylon	C	63	16	1	1		
India	C	34,428	3,275				
India (French)	C	10					
Indochina	C	4,397	246				
Iran	C	510	11				
Iraq	C	195	33	6			
Palestine	C	101	8				
Syria and Lebanon	C	987	24	7	8		
Trans-Jordan	C	18	1				

SMALLPOX—Continued

[C indicates cases; D, deaths]

Place		January–September 1943	October 1943	November 1943—week ended— 6	13	20	27
EUROPE							
Belgium	C	1					
France	C	2					
ermany	C	1					
ibraltar	C	1					
Portugal	C	40	2		2		1
land	C	1					[1] 1
in	C	204	5				
tzerland	C	17					
rkey	C	8, 161	499				
NORTH AMERICA							
ritish Honduras	C					1	
anada	C	6					
atemala	C	27					
xico	C	306	21				
SOUTH AMERICA							
razil	C	44	5				
itish Guiana	C	1					
olombia	C	316	19	2	1	6	
uador	C	18	4				
ru	D	12					
nezuela	C	91	4				

[1] On a vessel from North Africa.

TYPHUS FEVER

[C indicates cases; D, deaths]

Place		January–September 1943	October 1943	November 1943—week ended— 6	13	20	27
AFRICA							
lgeria	C	8, 130	48				
sutoland	C	18					
lgian Congo	C	20	19				
itish East Africa:							
Kenya	C	1	2	1			
Mombasa	C	1					
Uganda	C	1					
ypt	C	39, 582	202	48	46	54	
d Coast	C	9					
rocco (French)	C	13, 552					
rocco (Spanish)	C	369					
eria	C	9	2				
tuguese East Africa	C		1				
odesia, northern	C	10		4			
egal	C	2					
Dakar	C	15	4		3		
erra Leone	C	3					
nisia	C	232	20				
nion of South Africa	C	1, 587	8				
ASIA							
hanistan	C	520					
hina: Shanghai	C	12					
ndia	C	1, 066					
an	C	9, 158					
q	C	1, 421					
lestine	C	266	30	9	1	6	8
yria and Lebanon	C	81	8				
Trans-Jordan	C	15	2				
EUROPE							
ulgaria	C	1, 712	33				
ance—Seine Department	C	2					
rmany	C	[1] 973					
ungary	C	737	50		20	7	
sh Free State	C	19			1		
etherlands	C	1					
rtugal	C	9					
mania	C	6, 960	197			81	
vakia	C	452	72	12	81		
ain	C	578					
key	C	3, 951					

[1] For the period Jan. 1 to Apr. 30, 1943.

TYPHUS FEVER—Continued

[C indicates cases; D, deaths]

Place		January-September 1943	October 1943	November 1943—week ended— 6	13	20	27
NORTH AMERICA							
Cuba	C	1					
Guatemala	C	967	145				
Jamaica	C	24	5			2	
Mexico	C	902	82				
SOUTH AMERICA							
Brazil	C	1					
Chile	C	211	9	2	2	1	
Colombia	D	2					
Ecuador	C	277	42				
Peru	C	14					
Venezuela	C	17					
OCEANIA							
Australia	C	89	7	5	1		
Hawaii Territory	C	32	20	2	3	2	

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-September 1943	October 1943	November 1943—week ended— 6	13	20	27
AFRICA							
Belgian Congo:							
Bondo	D	2					
Kinzao	D	1					
Leopoldville	C	2					
Stanleyville	D	1					
Yanonge	C	1					
British East Africa: Kenya—Misumu	C						
Dahomey:							
Djougou District	C	[2] 2					
Natitingou	C	[2] 1					
French Guinea:							
Dubreka	D		[3] 1				
Matakang Island	D			[3] 1			
Gold Coast: Asuboi	C	1					
Ivory Coast:							
Abidjan	C		[2] 1				
Toumodi	D				[2] 1		
Portuguese Guinea.[4]							
Senegal:							
Goudiri	D					1	
Kolda	C	1					
Tambacounda	C		1				
SOUTH AMERICA							
Brazil: Para State	D	1					
Colombia:							
Boyaca Department	D		4				
Cundinamarca Department	D	3					
Intendencia of Meta	D	2					
Santander Department	D		1				

[1] For the month of November 1943.
[2] Suspected.
[3] Previously reported as having occurred at Conakry.
[4] During the week ended Nov. 13, 1943, a serious outbreak of yellow fever was reported in Portuguese Guinea. No figures are available.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

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ins (1) current information regarding the prevalence and geographic ri of communicable diseases in the United States, insofar as data are in , and of cholera, plague, smallpox, typhus fever, yellow fever, and other tant communicable diseases throughout the world; (2) articles relating to use, prevention, and control of disease; (3) other pertinent information .ding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1943

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